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Envisaging Future | Updating Present

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52 pages including cover

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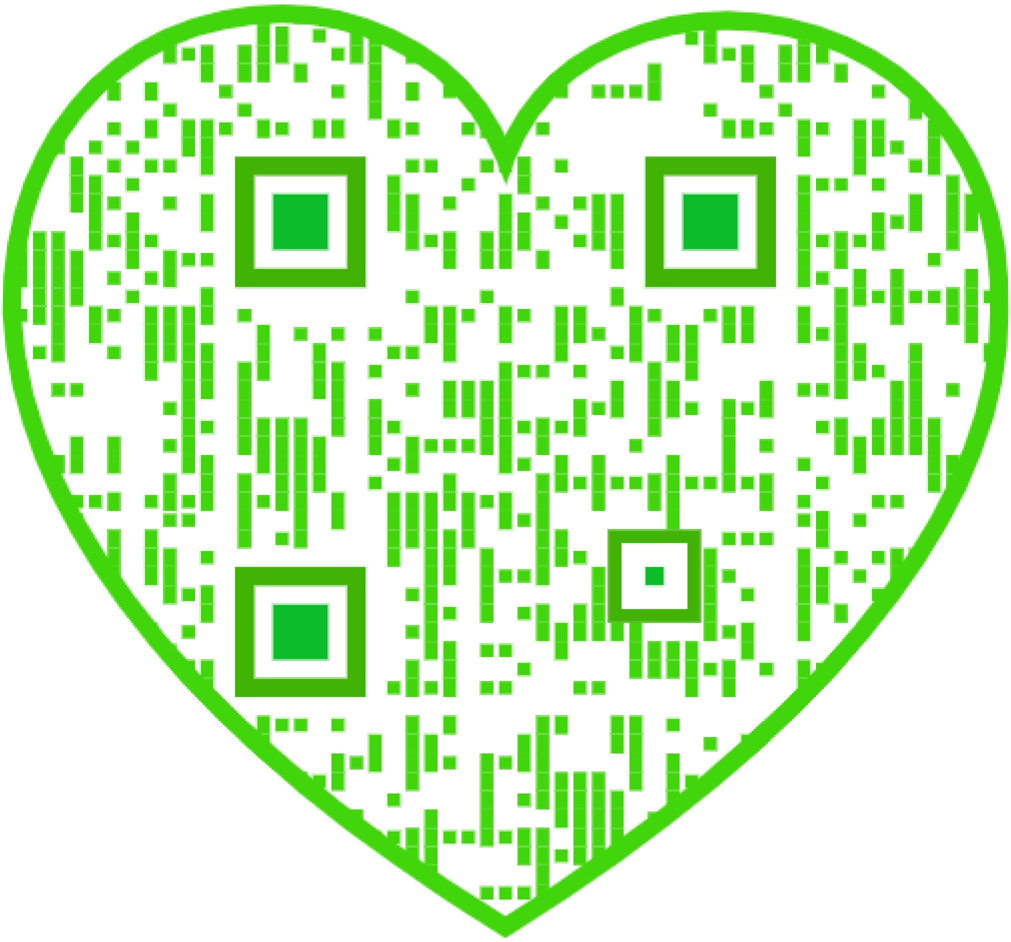

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Letter from Publisher

Ravindra Boratkar
Publisher &
Managing Editor,
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Dear Readers,

Modern agricultural machinery plays a vital role in raising agricultural productivity and output. Increasing farm mechanisation appears the most promising of all the strategic interventions needed to promote sustainable agricultural expansion. India's total farm mechanisation rate is 47 per cent, which is still less than the 70 per cent level in developing nations like China and Brazil. Given that half of India's arable land is rainfed and 82 per cent of farmers fall into the small and marginal categories, farm mechanisation is even more important in the country. Our lead story states that there is an urgent need to develop and promote the farm mechanisation sector for small and marginal farms.

India's agriculture sector faces two major challenges: a declining labour force and rising food demand, which calls for a ramp up in both production quantity and quality. While more farm mechanisation is required to increase production, it has increased the use of diesel-powered tractors, raising carbon emissions and operating costs. An effective and sustainable solution to these issues is the usage of electric tractors (e-tractors). As e-tractors use less energy and are low on maintenance, they result in lower operating costs. To boost consumer demand for e-tractors, our correspondent discusses how the government might encourage manufacturers to introduce new models and expedite product development.

India ranks eighth globally in terms of walnut production. The majority of India's walnut output comes from the state of Jammu & Kashmir, making it the top walnut-producing region in the nation. Walnut cultivation thrives in the area's mild, temperate climate. The India Brand Equity Foundation estimates that by 2025-26, India's food consumption would reach $1.2 trillion due to changing consumer tastes and increased urbanisation, which will raise demand for processed walnuts in the nation. Indeed, exporting walnuts has the potential to significantly boost foreign exchange earnings. As per our team's recommendations, exporters should implement a comprehensive approach that prioritises supply chain efficiency, value-added product creation, market expansion, quality enhancement, and brand awareness.

India loses 5-13 per cent of its fruits and vegetables and 3-7 per cent of crops including oilseeds and spices between harvest and consumption, according to a 2022 government-sponsored study. This leads to an economic loss of over Rs 1.52 trillion every year. These losses are mostly caused by insufficient storage facilities, ineffective management, and unfavourable weather. India Infrastructure Research estimates that by 2026-27, the capacity for agricultural warehousing—which was 145 million tonnes (MT) in June 2023—must increase to 223 MT. As India's agri-warehousing sector evolves further, an expert has noted that it needs to prepare for long-term sustainability while addressing current issues.

The agritech ecosystem offers a game-changing chance to boost agricultural productivity by 25-35 per cent while generating $95 billion in economic output. This is a crucial time for agribusinesses to make strategic decisions. According to an industry leader, businesses that make technology integration investments now will be in a better position to gain market share in the quickly expanding agritech sector, forge closer bonds with farming partners, and create competitive advantages through data-driven operations.

I am sure you will find this edition a great read.

Thanks & Regards,

Ravindra Boratkar
Publisher & Managing Editor

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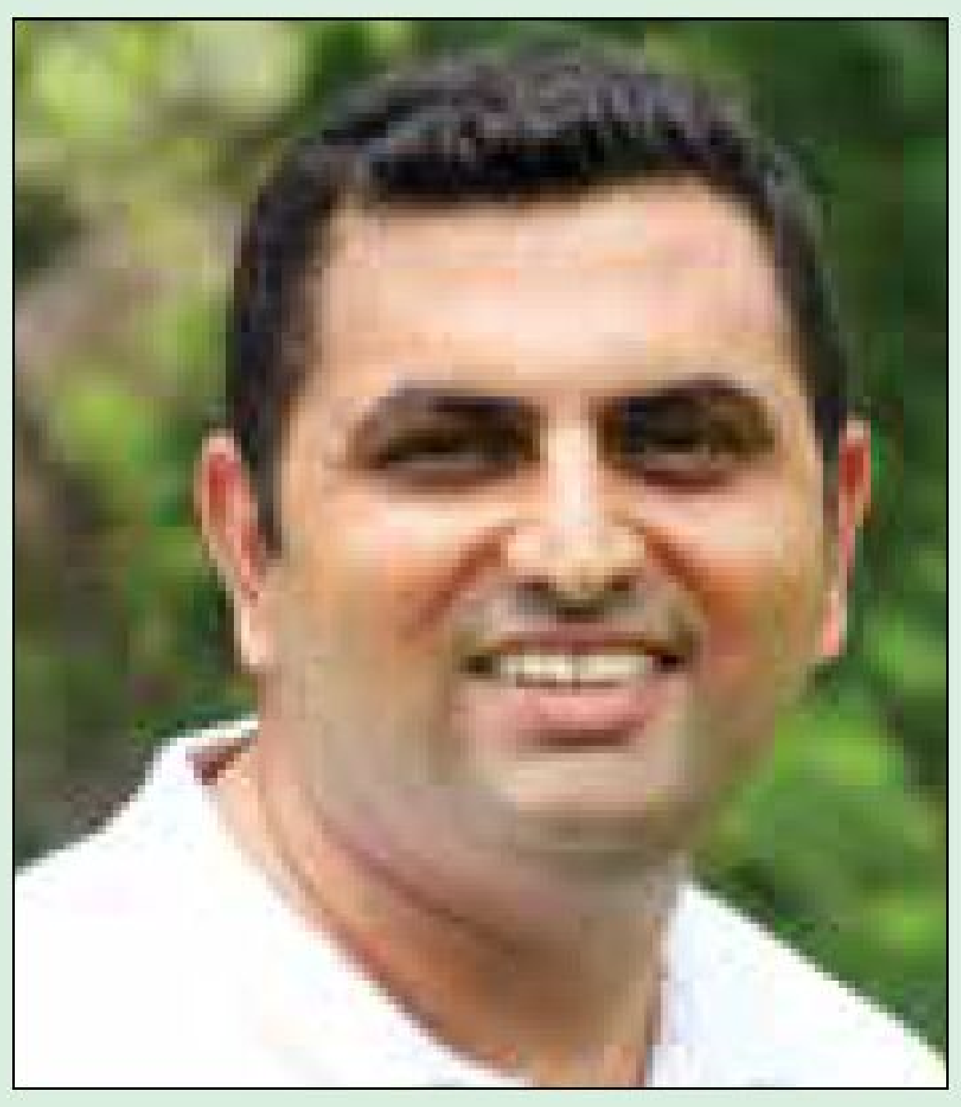

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2025
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TOP VIDEO

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Courtesy- Indian Chamber of Food and Agriculture

Mohit Kapoor, Zonal Head Maharashtra, Sonalika tractors talk about the future of farm mechanisation industry in India by 2030.

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Narayan Singh Kushwah, Minister for Horticulture and Food Processing of Madhya Pradesh talks about cluster development for vegetables and spices in MP.

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Feedback

Useful article on Fruit export industry

Thank you AgroSpectrum for publishing the article "Fruit export industry to witness unparalleled expansion with customer-focused mindset" by Purnima Khandelwal, CRO, Output business, AgroStar Group in January 25 issue. Article has provided useful information and analysis about fruit export market that will definitely help fruit producers and exporters.

Fanindra Reddy, Bangalore

Interesting interview on agro-food processing in Aunachal Pradesh

The interview of Gabriel D Wangsu, Minister, Agriculture & Allied Sectors, Arunachal Pradesh published in January 25 issue provides interesting information about the horticulture and agri-food processing industry in Arunachal Pradesh. Such information gives direction to small-scale entrepreneurs for their future ventures.

Nilambika Kusurkar, Mumbai

Coverage of agri industry in Asia

AgroSpectrum should focus on the business activities in agriculture industry from other neighbouring countries in the Asia-Pacific region. It will not only inform the readers about the agri industry but also help in approaching the concerned company for future collaborations.

Amogh Dindorkar, Pune

Target Sustainability with Precision Agri

Precision is a key to success in business sectors and professions. Agriculture is no exception. Meeting growing food demand and at the same time maintaining sustainability is a major challenge that only precision agriculture can help to meet. A combination of different technologies leads to precision farming.

In October, Union Minister of State for Agriculture Ramnath Thakur stressed the need for scaling up precision farming for sustainable growth. The farm scientists too echoed similar feelings. In January, speaking at a national conference on the AI application at the University of Agriculture Science in Raichur, farm scientists called for switching to smart agriculture to meet growing demand. But growing demand will have to be met even considering the environmental angle. That highlights the role of precision farming in sustainability.

Technology plays a key role in achieving precision, digital technology more so. Indian agriculture is already using technology. Various aspects of technology like soil sensors and data-driven solutions along with satellite imagery provide deep insight and help farmers in their farm activities in different ways. Though there is a noteworthy advancement in this area, much more scope for technology usage still exists. In that direction, the government's recent plan is an important one in moving our agriculture sector ahead on the path of digital technology and subsequently precision farming. The government is planning to cover all states under digital crop survey by next year. The digital survey will replace the traditional method of the manual survey system by Patwaris. Methods of visual observation, experience, intuition etc. are known as soft precision. But hard precision uses modern technologies and techniques, scientific analysis, data analysis etc. for real precision.

The digital crop survey will be useful for various purposes including estimating robust crop sown area and output of crop in advance. The digital survey was initiated in 2023-24. But it was restricted to 11 states. In November 2024 data from a digital survey was used for the first advance estimate of food grain production. Now the digital survey will be extended across the country.Using technologies including remote sensing, geospatial analysis and artificial intelligence, the crop production data generated from digital surveys will help government departments to implement minimum support price (MSP) based procurement, giving crop insurance and credit card linked crop loans and developing systems for the balanced use of fertilisers and other inputs. Digitalisation would provide more accurate production forecasts and help implement measures to improve supply.

The part of developing systems for balanced use of inputs will help a lot in sustainability as precision farming uses information technology to ensure that crops and soil receive exactly what they need for optimum productivity. Technologies and equipment like data analytics, sensors, drones etc. can help in optimising the use of inputs like water, chemicals, fertilisers, pesticides, nutrients etc. Rather than applying the inputs generally across the entire field, the precision approach with the help of technology aims to manage and distribute them on a site and crop-specific basis to maximise the long-term cost-benefit ratio as well as prevent any waste. Precision farming's one more important aspect is understanding and gaining more knowledge of the natural variability within a farm. A recent news item quoting the NABARD focus paper on Goa has mentioned one more important use of information technology in the agriculture field. The paper said that disputes over the ownership of land remain a 'major hindrance' for farmers seeking crop loans. Disputes over ownership of land can be resolved by digitisation of land records at the state level, the paper added.

Among the various technologies that are leading to precision farming is the use of drones. Drone usage is fast becoming popular in farm activities as it has shown how it can be useful in improving farming efficiency, improving crop management and helping sustainability. No wonder a lot of drone companies have emerged in the last few years and will continue to emerge more. Similarly, more companies in other aspects of agriculture-related information technologies are expected to grow, giving a boost to agritech and precision farming. AS

Dr Milind Kokje,
Chief Editor
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Govt to introduce remote sensing for accurate assessment of crop loss

The government has decided that now the crop loss will be assessed correctly and accurately through satellite based i.e. remote sensing. As a way forward towards bridging the price gap between the producing and consuming states, the government has decided to bear the cost of transportation and storage as well. Shivraj Singh Chauhan, Union Minister, Agriculture and Farmers Welfare said that earlier the loss was assessed manually through crop cutting now the Central government has decided that it will now be done through remote sensing. This will ensure correct and accurate assessment of crop loss and the amount will be transferred at the right time through DBT, if any insurance company delays in giving the claim, then it will have to pay 12 per cent interest on the amount. He said that the Centre will give its share of the amount immediately. He appealed to the states to also make arrangements to give money immediately in such a situation.

Dr Jitendra Singh unveils Kisan Kavach- indigenous anti pesticide suit

Dr Jitendra Singh, Union Minister of State (Independent Charge) for Science and Technology; Earth Sciences and Minister of State for PMO, unveiled Kisan Kavach, first-of-its-kind anti-pesticide bodysuit. Designed to protect farmers from the harmful effects of pesticide exposure, this innovation marks a transformative step in ensuring farmer safety and aligns with the Prime Minister's vision of using science and technology to empower the agricultural community. Developed by BRIC-inStem, Bangalore, in collaboration with Sepio Health Pvt Ltd, the bodysuit offers protection against pesticide-induced toxicity, which often leads to severe health complications, including breathing disorders, vision loss, and, in extreme cases, death. The washable and reusable suit, priced at Rs 4,000, can last up to a year and employs advanced fabric technology to deactivate harmful pesticides upon contact, ensuring farmer safety like never before.

ch By
ra Singh

Cabinet approves continuation of PMFBY & RWBCIS till 2025-26

The Union Cabinet has approved the continuation of Pradhan Mantri Fasal Bima Yojana (PMFBY) and Restructured Weather Based Crop Insurance Scheme (RWBCIS) till 2025-26 with a total budget of Rs 69,515.71 crore. The aim of this decision is to provide risk coverage to farmers against natural calamities. The Cabinet approved setting up of Fund for Innovation and Technology (FIAT), with an allocation of Rs 824.77 crore for technology improvements in insurance schemes. Key initiatives include Yield Estimation System using Technology (YES-TECH), which uses remote sensing for crop yield estimates. Weather Information and Network Data System (WINDS) for augmenting weather data through automatic weather stations.

Cabinet extends One-time Special Package on DAP beyond NBS subsidy

The Union Cabinet, chaired by the Prime Minister Narendra Modi, has approved the proposal of the Department of Fertilizers for extension of One-time Special Package on Di-Ammonium Phosphate (DAP) beyond the NBS subsidy @ Rs 3,500 per tonne for the period from January 1, 2025 till December 31, 2025 to ensure sustainable availability of DAP at affordable prices to the farmers. The tentative budgetary requirement for above would be approximately up to Rs 3,850 crore. 28 grades of P&K fertilisers are made available to farmers at subsidised prices through fertiliser manufacturers/importers. The subsidy on P&K fertilisers is governed by the NBS Scheme with effect from April 1, 2010. Continuing topmost priority in keeping farmers' welfare in firm focus, Government of India has extended a massive relief to farmers in keeping the price of DAP fertiliser unchanged.

Cabinet approves trade on Non-Basmati White Rice between India & Indonesia

The government has approved the signing of Memorandum of Understanding (MoU) on trade of Non-Basmati White Rice (NBWR) between the Ministry of Cooperation of the Government of India and the Ministry of Trade of Indonesia. This MoU is for trading of one million metric tonnes of NBWR annually based on production and international prices. The duration of the MoU will be four years and will be automatically extended for an additional four years and it will help to address the trade imbalance and strengthen India-Indonesia trade relations. This agreement will be implemented by National Cooperative Exports Limited (NCEL), authorised by the Ministry of Cooperation. NCEL will source NBWR from the open market through a transparent tender process and from co-operative societies, thereby not distorting the market.

Odisha in collaboration with Palladium inks 11 MoUs at Krushi Odisha 2025

The Directorate of Horticulture, Government of Odisha in collaboration with Palladium Consulting India Pvt Ltd, signed 11 Memorandums of Understanding (MoUs) with private sector exporters at Krushi Odisha 2025 held on January 7 in Bhubaneswar. This milestone agreement aims to bolster the export and value addition of Odisha's fresh fruits and vegetables, empowering local farmers with better market access, fair pricing, and global recognition. The MoUs mark a significant stride in Odisha's journey to establish itself as a leader in agricultural and horticultural exports, aligning with the state's strategic vision for sustainable growth. Odisha is on a transformative path to position itself as a leader in agricultural exports. The collaboration with exporters supported by the Technical support Unit led by Palladium and the signing of these MoUs reflects the state government's dedication to empowering farmers, enhancing value addition, and ensuring remunerative market access for its produce on a global scale.

Moonrider raises Rs 19 Cr in seed round from AdvantEdge Founders, Micelio Technology Fund

Moonrider, an Electric Tractor Technology Company headquartered in Bangalore, has raised a seed round of $2.2 million (Rs 19 crore) co-led by AdvantEdge Founders and Micelio Technology Fund, in addition to a clutch of angel investors. Moonrider, founded in August 2023 by Anoop Srikantaswamy and Ravi Kulkarni, leverages their extensive backgrounds in vehicle engineering and electric vehicle R&D from the Volvo Group, Ola Electric & Olectra BYD. Moonrider offers a comprehensive range of heavy-duty electric tractors that significantly reduce operational costs for farmers and fleet operators. The funds raised will be directed towards fostering innovation and building strong capabilities in vehicle engineering, vehicle software and battery technology.

Matix Fertilisers to invest Rs 7,500 Cr to increase its urea production capacity

India's one of the leading urea producers Matix Fertilisers and Chemicals has announced plans to invest approximately Rs 7,500 crore to double its urea production capacity. The investment will fund a brownfield expansion at its existing urea plant in Panagarh Industrial Park, West Bengal. With the expansion, the company expects to significantly increase its market share. The Rs 7,500 crore investment will be financed through a mix of debt and equity. For FY24, Matix Fertilisers reported a revenue of Rs 6,900 crore, up from Rs 5,700 crore in FY23. Currently, the company operates at a production capacity of 1.27 million tonnes per annum (MTPA), but it has consistently exceeded this capacity in recent years. In the last financial year, Matix Fertilisers achieved 118 per cent capacity utilisation, producing 1.5 million tonnes. This year, the company continues to operate at 112-113 per cent capacity utilisation, demonstrating operational excellence.

Servotech bags order for 1100 Grid-Connected Agriculture pumps from UPNEDA

India's top producer of solar solutions and EV chargers, Servotech Renewable Power System Ltd. (formerly Servotech Power Systems Ltd.), has received an order from the Uttar Pradesh New and Renewable Energy Development Authority (UPNEDA), which is part of the government of Uttar Pradesh, for about 1100 grid-connected agriculture pumps under the 'KUSUM Component C-1 Scheme.' This project will significantly advance India's transition to a solar-powered nation by solarising Uttar Pradesh's agriculture. Grid-connected agriculture pumps and solar power plants will be manufactured, supplied, installed, tested, and put into service as part of an approximately Rs 31-crore project. In addition, the project calls for Servotech to provide full warranty maintenance for the next five years for pumps with capacities of two, three, and five horsepower with solar power plants that have capacities of three, four, and seven and a half kilowatts, for a total of 1094 solar pumps throughout Uttar Pradesh that will help the state meet its renewable energy targets.

Global Environment Facility approves $68 Mn for agrifood systems solutions

The Food and Agriculture Organization of the United Nations (FAO) has helped 22 countries unlock $68 million in financing from the Global Environment Facility (GEF) to address biodiversity loss, groundwater management, climate change, land degradation, and pollution. The projects expect to leverage an additional $273 million in co-financing to advance global goals for biodiversity, social inclusion, land and water management, and reducing use of hazardous chemicals. As part of the funding, the Council approved a $19 million allocation for FAO's first activities as a new implementing agency for the Small Grants Program. The project builds upon 30 years of impact by bringing FAO's expertise in working with smallholder producers to support civil society organisations and community-based organizations in co-designing and delivering locally led initiatives.

Godavari Biorefineries to invest Rs 130 Cr in grain-based distillery to enhance ethanol production

Godavari Biorefineries Limited (GBL), a pioneer in renewable chemicals and biofuels, has announced an investment in corn/grain-based ethanol to further strengthen its ethanol production capabilities. The company plans to invest approximately Rs 130 crore in a new 200 KLPD corn/grain-based distillery to its existing operations, enhancing flexibility through dual-feedstock capability. The company reported a 25 per cent Y-O-Y increase in revenue growth in H1FY25, demonstrating its operational strength and focus on sustainable growth. The facility is expected to be completed by Q4 FY 2026 and will be developed with funds from Internal accruals and debt. This strategic move aligns with GBL's long-term vision of supporting India's transition to green energy while ensuring resilience against climate-induced risks. The new facility will offer operational fungibility, enabling the use of alternative feedstocks such as maize to mitigate disruptions caused by factors like poor monsoons and policy changes.

World Bank approves project worth $325 Mn to boost agriculture in Uttar Pradesh

The Uttar Pradesh Agriculture Growth and Rural Enterprise Ecosystem Strengthening (UP-AGREES) Project, a $325.10 million initiative, has received approval from the World Bank. As a way to encourage these initiatives, the project also seeks to garner $15 million in private investment. Uttar Pradesh, which stands first in wheat production, second in rice production, and third in agricultural exports, has become an important player in Indian agriculture over the last ten years. Nevertheless these advancements, low productivity, constrained access to cutting-edge technology, and sufficient post-harvest infrastructure remained issues for small-scale farmers. The UP-AGREES Project aims to address these barriers, benefiting one million producers, particularly in the Eastern UP and Bundelkhand regions.

CIFE licenses technologies to COFFED to enhance fisheries and aquaculture in Bihar

In a significant step in advancing the fisheries and aquaculture sectors, the ICAR-Central Institute of Fisheries Education (CIFE) has licensed two unique technologies to the Cooperative Fisheries Federation (COFFED) in Patna, Bihar. The innovations, which aim to improve the sustainability and productivity of the fishing sector, were officially handed over during a ceremony. The Catfish Hatchery and raising of Seed under the Three-Tier System, the first licensed technology, marks a significant advancement in sustainable hatchery management and seed raising for catfish farming. Dr C.S. Chaturvedi, Dr W.S. Lakra, Dr Arpita Sharma, and Dr A. Landge developed this unique method, which has already been trademarked and has the potential to alter India's catfish farming operations. The second technology, FishANUre, is a do-it-yourself option that allows farms to turn fish waste into organic manure. This novel strategy, developed by Anurag Singh, Dr Arpita Sharma, Dr Martin Xavier, and Shubham Soni, addresses waste management issues while supporting sustainable agriculture.

FAO releases new guidelines for surveillance of influenza in cattle

The Food and Agriculture Organization of the United Nations (FAO) has released new guidelines advising its members how to implement effective surveillance programmes for early detection of influenza in cattle. FAO's new guidelines follow a previous technical publication summarising the emerging situation, knowledge gaps and recommended risk management actions, and emphasize the critical role of effective passive surveillance systems that encourage reporting of suspected cases from farmers and veterinarians. Enhanced reporting should be focused on high-risk areas such as those with dense poultry or dairy cattle populations or migratory bird activity, and consideration should be given to tapping into informal sources including market price changes, social media and community networks.

Hon'ble Union Minister
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Union Fisheries minister lays foundation stone for 50 projects in northeast

Rajiv Ranjan Singh, Union Minister for Fisheries, Animal Husbandry and Dairying laid the foundation stone for 50 projects worth Rs 50 crore to enhance the northeast region's fishery infrastructure, productivity and create job opportunities. The minister launched the 'Organic Fisheries Cluster' in the Soreng district for development of organic fisheries and aquaculture in Sikkim under the Pradhan Mantri Matsya Sampada Yojana (PMMSY). Of the total 50 projects under PMMSY, a maximum of 24 projects will be implemented in Sikkim, followed by Assam (12), Tripura and Nagaland (3 each) and Meghalaya (1). In Assam, an Integrated Aqua Park will be established in the Darrang district with a capacity to produce 150 tonnes of fish annually creating up to 2,000 job opportunities.

UPL, CH4 Global to distribute methane-reducing feed supplement for cattle

Agricultural solutions provider UPL Limited has signed a strategic partnership agreement with CH4 Global to distribute a methane-reducing feed supplement for cattle across major livestock markets. The multi-year collaboration will target India, Brazil, Argentina, Uruguay, and Paraguay, which collectively account for over 40 per cent of the global cattle population. Methane Tamer, CH4 Globals flagship product innovation, is a stable, formulated cattle feed supplement based on whole Asparagopsis seaweed that has been shown in studies to reduce enteric methane emissions from cattle by up to 90 per cent when used as recommended. Under the multi-phase, multi-year agreement, the company and CH4 Global will develop a comprehensive roadmap targeting key livestock markets in India, Brazil, Argentina, Uruguay and Paraguay. The collaboration will establish specific business models to distribute CH4 Globals Methane Tamer cattle feed additive in each of these markets.

GCMMF sets its footprints in Europe

The Gujarat Cooperative Milk Marketing Federations (GCMMF) brand Amul has entered the European market from February 1 after launching its products in the US. “We will be launching milk, fresh products in Europe by the end of January,” mentioned Jayen S Mehta, Managing Director, GCMMF at the annual convocation of Indian Institute of Foreign Trade (IIFT). The company first launched its products in Spain and then looked at expanding to other countries in Europe. Milk is a source of livelihood for more than 10 crore families in the country and most of the producers are small and marginal farmers. India allows the import of dairy goods at a 30 per cent duty. In March last year, GCMMF launched four variants of milk in the US market to cater to the Indian diaspora and Asian population.

Amul
DAIRY
Amul
Amul

CIBA and BRC Marine Products partner to evaluate DDGS in Pacific White Shrimp diet

ICAR-Central Institute of Brackishwater Aquaculture (CIBA) inked a Memorandum of Understanding with the team of BRC Marine Products, Dhamana, Bhadrak district, Odisha, a seafood processing and export firm specialising in marine products. The MoU aims to evaluate the utility of rice distillers’ dried grains with solubles (DDGS) in the diet of Pacific white shrimp, P. vannamei. Dr Kuldeep Kumar Lal, Director, ICAR-CIBA, highlighted the importance of alternative protein sources and stressed the necessity for diversified resources for sustainability and cost-effectiveness. S.N. Yadav, BRC Marine Products, Odisha, spoke about the company’s initiatives in marine product processing, aquaculture, and bio-ethanol production.

Sahyadri raises Rs 390 Cr from responsAbility, GEF Capital Partners & existing investors

Sahyadri Farms Post Harvest Care Limited, India's largest fully integrated and tech-enabled horticulture platform, has raised Rs 390 crore from Europe-based PE fund responsAbility, and US-based PE fund GEF Capital Partners, along with participation from all existing investors-FMO, Proparco, Incofin and Korys. The company will utilise the funds to expand climate-resilient patented varieties of table grapes and citrus and augment its packhouse and processing capacities for Fruits and Vegetables (FnV) and value-added products like aseptic, IQF, freeze-dried, juice concentrates and dry fruits. Sahyadri Farms operates an end-to-end FnV supply chain from facilitating farmers/FPOs to grow international- quality produce to primary/secondary processing to marketing the products to marquee international and domestic customers. The company raised its first institutional round of Rs 310 crore on September 22, 2024 from FMO, Proparco, Incofin and Korys.

Wavar, Krushi Sarthi to accelerate adoption of IPM practices across farming regions

Wavar, a leading agri-tech company, announced a strategic partnership with Krushi Sarthi, known for its strong grassroots connections and farmer-focused initiatives to accelerate the adoption of Integrated Pest Management (IPM) practices across key farming regions. This collaboration marks a significant step in Wavar's mission of "Har Gaon IPM" – bringing sustainable pest management solutions to farming communities at scale. Through this partnership, Wavar and Krushi Sarthi will leverage their combined expertise to empower farmers with advanced IPM technologies, reduce chemical dependency and improve overall crop health and profitability. Krushi Sarthi will play a crucial role in implementing Wavar's IPM solutions on the ground.

IIT Madras to collaborate with Agriculture Ministry on Project VISTAAR

Indian Institute of Technology Madras (IIT Madras) is collaborating with the Ministry of Agriculture and Farmer Welfare, Government of India, on Project VISTAAR, which seeks to improve the efficiency and effectiveness of the agricultural extension system through digitalisation. The pilot project VISTAAR (Virtually Integrated System to Access Agricultural Resources) seeks to further strengthen the agricultural extension system. The MoU signed recently between the Agriculture Ministry and IIT Madras enables them to enrich the VISTAAR platform with information about startups in the agriculture and allied sectors. This would enable farmers and other stakeholders in agriculture and allied sectors to be aware of the capabilities and offerings that startups have and easily access them. Startups are known for their innovation and capabilities to use technology to bring new products and services to market. The context of the agriculture sector presents unique opportunities for startups, both from the supply side and demand side.

Garuda Aerospace soars high with 20 patents, including 6 global patents

India's fastest-growing drone startup, Garuda Aerospace announced that the company has been granted a total of 20 patents. Further solidifying the company's position is the inclusion of 6 international patents. The patents granted to Garuda Aerospace cover a range of agriculture drone solutions spanning mapping, surveying, spraying, inspections, crop health monitoring, field surveillance, yield monitoring, seed dropping and more. The other patents granted to Garuda Aerospace beyond agriculture include underwater drones for inspection, health Inspection drones, miniature radar system drones for surveillance and detection of drones, surveillance drones for identifying suspicious behaviour, monitoring crowded events, medicare delivery drones, etc. Committed to research and development in the drone-tech sector, the patents received strengthen Garuda Aerospace's position in the global market.

bigbasket partners with Andhra Pradesh to strengthen organic produce market linkage

Bangalore-based bigbasket, a TATA Enterprise, has signed a landmark Memorandum of Understanding (MoU) with the Government of Andhra Pradesh to strengthen the organic produce market linkage. This partnership will enable bigbasket to source organic fruits, vegetables, and staple items directly from organic farmers across the state and supply them to its distribution centres nationwide. The MoU was signed in the presence of the Chief Minister of Andhra Pradesh, N. Chandrababu Naidu, marking a significant step towards strengthening the organic agriculture ecosystem and supporting the state's farmers. As part of the collaboration, bigbasket will establish four new collection centres in Andhra Pradesh, ensuring a daily supply of fresh, high-quality organic produce. The initiative aims to improve the livelihoods of local organic farmers and enhance consumer access to sustainable, organic products.

Farmery launches fresh fruits & vegetables range with a focus on Farm-To-Fork freshness

Farmery, a leading D2C brand in the farm fresh food industry, is revolutionising how consumers access high-quality farm fresh, pure & natural produce through its farm-to-fork approach. With the introduction of its Fruits & Vegetables range, Farmery ensures that customers receive fresh, carefully sourced produce delivered daily. Farmery's farm-to-fork model gives the brand full control over sourcing, partnering directly with local finest farmers to harvest fruits and vegetables at their peak for optimal freshness and flavour. By placing early morning orders, the brand ensures timely harvesting and delivery, preserving nutritional integrity and minimising transit time for fresher produce. Farmery's sustainability commitment extends beyond sourcing. The brand works with farmers who use sustainable farming methods and responsible land management, ensuring products are free from harmful chemicals and preservatives.

Groundwork BioAg & ADAMA partner to offer Rootella Inoculants in China

Groundwork BioAg, the largest global producer of mycorrhizal inoculants, and ADAMA Ltd, a leading global crop protection company, announced an exclusive commercial agreement to offer Rootella mycorrhizal inoculants to Chinese farmers. This collaboration builds on Groundwork BioAg's successful introduction of Rootella to local distributors in China earlier this year, following the product's approval for commercialisation in 2023. China represents a significant opportunity for mycorrhizal inoculants, with approximately 127 million hectares of harvested cropland. Rootella, a biostimulant based on naturally robust strains of mycorrhizal fungi, offers Chinese farmers a natural and cost-effective solution to improve crop yields, enhance soil health, and reduce dependency on synthetic fertilizers. It is particularly beneficial for farmers growing vegetables, sugarcane, potato, and row crops including cotton, corn and soybean.

South Korea's DL E&C marks first entry into Canadian Blue Ammonia fertiliser market

DL Engineering & Construction (DL E&C), one of South Korea's top five construction companies, has made its debut in the Canadian fertiliser plant project, paving the way for its entry into the North American blue ammonia market. With a projected total value of $2 billion, the larger EPC phase of the project presents a significant opportunity for DL E&C to solidify its position in the region, marking a strong future for sustainable development initiatives. DL E&C signed a contract with Genesis Fertilizers, a Canadian fertiliser company, at the Embassy of Canada in Seoul. Under the contract, DL E&C will carry out the high-tech Front-End Engineering Design (FEED) phase, while its subsidiary CARBONCO will provide licensing for Carbon Capture, Utilization, and Storage (CCUS) technology.

Indonesia's Koltiva empowers smallholders of natural rubber industry in Southeast Asia

Koltiva, Indonesia's leading agritech company for enterprises to make global supply chains traceable, inclusive, and climate-smart, has introduced tailored solutions that empower smallholder producers. Koltiva provides comprehensive support to help smallholders comply with EUDR regulations. From supply chain mapping and land documentation to training and traceability through its (traceability platform) KoltiTrace and (producers' training coaching) KoltiSkills solutions, Koltiva ensures smallholders meet standards and maintain access to global markets. To support smallholder producers meeting the complex requirements of the EUDR, KoltiSkills offers a range of specialised services to build capacity and ensure compliance. For instance, KoltiSkills has already coached approximately 6,000 rubber producers, equipping them with the knowledge, skills, and tools needed to navigate regulatory challenges effectively.

H2 Global Energy Consortium to establish 1MMT green ammonia production plant in Jordan

H2 Global Energy, in partnership with a consortium of industry leaders, is gearing up to establish a one-million metric tonne(MMT) green ammonia production plant in Aqaba, Jordan. A technical report for the pioneering Green Ammonia Production Facility has been submitted by the partnership, marking a significant step towards the advancement of the green hydrogen and green ammonia sectors, taking advantage of Jordan's strategic location and potential to produce renewable energy. The technical report outlines the detailed framework for the development, construction, and operation of the facility, with a clear focus on sustainability and innovation. Once operational, the plant will significantly contribute to reducing carbon emissions across various industries while supporting Jordan's renewable energy objectives.

Vietnam's TMA Solutions partners with True IDC to deliver AI as a service (AIaaS)

TMA Solutions from Vietnam has partnered with True IDC, a leading cloud service provider to deliver AI as a service (AIaaS). By combining IoT and AI technologies, TMA Solutions has developed various innovative agritech solutions, from product integrity, environment monitoring to supply chain. A recent solution is an AI-powered Pest Detection System to help farmers detect pests and safeguard crop yields. This system uses AI and IoT to automatically detect and classify harmful insects, providing real-time notifications to farmers for more targeted pesticide use. By integrating a mobile app, farmers can upload images for disease diagnosis and receive timely alerts. This solution improves crop management by increasing accuracy, reducing labour costs, and enhancing productivity, ultimately leading to healthier crops, higher yields, and more sustainable farming practices.

Grains Australia establishes Oilseed Council prioritising oilseed trade and market access

Grains Australia has announced the appointment of 11 industry representatives to its newly established Oilseed Council. Council members have been appointed for a period of three years and include people from across the Australian oilseed supply chain. The new Oilseed Council will join Grains Australia's existing Commodity Councils for barley, wheat, oats, and pulses, as well as the Grains Market Access Council. The Commodity Councils represent specific commodities and provide strategic advice to the Grains Australia Board. Grains Australia, an initiative of the Grains Research and Development Corporation, is responsible for vital industry services and functions that improve the industry's competitiveness and profitability. Grains Australia's Oilseed Council will have responsibility for overseeing the implementation of classification frameworks for Australian oilseed crops and providing expertise and advice in identifying oilseed trade and market access priorities, and requirements for market information and market education relevant to oilseeds.

Farm Mechanisation Sector Aligns with Sustainability-focused Self Reliance

Farm productivity has been adversely hit by a ceaseless migration of rural population to cities for 'better prospects' in the recent past, more so than ever before. This has triggered a significant growth in the market for farm machinery, especially tractors and harvesting equipment, to boost productivity. In 2023, the agricultural machinery market in India was valued at Rs 1.13 trillion and is expected to reach Rs 1.66 trillion by FY2029, expanding at a compound annual growth rate (CAGR) of 6.69 per cent during the 2024 - 2029 period. Government initiatives, such as the Pradhan Mantri Kisan Samman Nidhi and subsidies for agricultural machinery purchases, are also encouraging farmers to adopt advanced technologies, further fuelling the growth of India's agricultural machinery market. Business models such as custom hiring and tractor ownership have been started to increase the deployment of farm machinery across the country. Startups are supporting farmers through the Farming-as-a-Service (FAAS) model. With the support of new technologies such as electric tractors (e-tractors), precision agriculture and custom hiring the farm mechanisation industry is moving towards transformation from traditional tractor production to sustainable and customer-centric tractors by 2030. Let's explore further.

The role of modern agricultural machines is very crucial as they help in increasing agriculture production and productivity, improving the utilisation efficiency of costlier inputs such as seeds, fertilisers and irrigation water, besides the traditional use of humans and animals in farming. However, the adoption of mechanisation by the farmers of various states depends on varying factors such as socio-economic conditions, geographical conditions, crops grown, irrigation facilities etc.

Out of the multiple strategic interventions required to spur sustainable agricultural growth and achieve the vision of Viksit Bharat, improving the level of farm mechanisation seems to hold tremendous potential. The overall farm mechanisation level in India stands at 47 per cent which is still below the level of developing countries like Brazil and China where it is around 70 per cent. Farm mechanisation is even more important in India where 82 per cent of farmers belong to the small and marginal categories and half of the arable land is under the rainfed category. In these conditions, it becomes imperative for farmers to ensure the completion of activities on time. Multiple evidence suggests that the average yield in agriculture has a direct correlation with farm mechanisation.

According to the PwC report 'Farm Mechanisation: A Catalyst for Sustainable Agricultural Growth' published in February 2024, "Globally, the Asia-Pacific region holds the highest share (43 per cent) in the global farm machinery market. Among different kinds of farm machinery, tractors are used the most, having a share of almost 55 per cent. In India, of all farming equipment used by farmers, tractors make up 80 per cent of the total share. Due to the inclination towards increased tractor use in the country, the Indian agricultural sector is said to be 'tractorised'. At present, the farm power availability in India is at 2.49 kW/ha. The Government of India has thus set an ambitious target of raising the farm power availability in the country to 4.0 kW/ha by 2030.

In India itself, the average farm power availability varies greatly across different states – i.e. 5–6 kW/ha in Punjab and Haryana 0.2 kW/ha in the north-eastern regions. This discrepancy is one of the major reasons for the uneven development of agriculture in India. It is also important to note that the farm mechanisation level varies according to the types of crops as well – cereal crops like wheat and rice stand at about 50–60 per cent mechanisation, whereas horticulture crops have a much lower level of mechanisation. However, at the same time, farm power availability has increased tremendously in India during the recent decades, helping India to become one of the major net exporters of tractors in the world.

The government is keen to promote mechanisation with the specific aim of increasing the reach of farm mechanisation to small and marginal farmers and to the regions where the availability of farm power is low and promoting 'Custom Hiring Centres' to offset the adverse economies of scale arising due to small land holding and high cost of individual ownership of agricultural machines. A Centrally Sponsored Scheme 'Sub-Mission on Agricultural Mechanisation' (SMAM) was implemented in all the States and Union Territories from 2014-15 including the state of Uttar Pradesh. Under this scheme, financial assistance @ 40 - 50 per cent of the cost of machines depending on the categories of farmers is provided for the purchase of agricultural machines. Financial assistance @ 40 per cent of the project cost is also provided to rural entrepreneurs, (rural youth and farmers as an entrepreneur), Cooperative Societies of Farmers (CSFs), Registered Farmers Societies (RFSs), Farmer Producer Organisations (FPOs) and Panchayats for the establishment of Custom Hiring Centres (CHCs) and Hi-tech hubs of high-value agricultural machines. Financial assistance @ 80 per cent of the project cost for projects costing up to Rs 30 lakh are provided to the CSFs, RFSs, FPOs, Self Help Groups (SHGs) and Panchayats for setting up of village level Farm Machinery Banks (FMBs). The scheme promotes almost all agricultural machines and equipment for crop production and post-production activities.

Between 2014-15 and March 2024, Rs 7265 crore were allocated for agricultural mechanisation.18,16,221 machines and various other equipment have been provided to farmers on subsidy. 25,527 CHCs, 594 high-tech hubs and 23,538 FMBs have been established to make available agricultural machines and equipment to the farmers on a rental basis. During 2024-25, Rs 69.99 crore was released to the States.

Custom Hiring Centres (CHCs)

Making various farm machinery/equipment for small and marginal farmers at an affordable rent is one of the main objectives of Custom Hiring Centres (CHCs). It also helps in offsetting adverse economies of scale due to the high cost of individual ownership. CHC improves mechanisation in places with low farm power availability. It mainly provides hiring services for various agricultural machinery/implements applied for different operations. CHC helps to expand mechanised activities during cropping seasons in large areas, especially in small and marginal holdings. It also provides hiring services for various high-value crop-specific machines applied for different operations.

The farm power availability for small/marginal land holdings is the lowest. As the small/marginal holdings constitute 85 per cent of total land holdings, the potential for

CHC which will cater to the farm machinery requirement of such a vast area, is quite huge. Keeping in view the emphasis on agricultural farm machinery and the need for taking the farm machinery within the reach of small/marginal farmers, institutional credit needs to be made available for CHCs. Generally, FPOs have a base of more than 500 members, readily potential customers for the CHC. Further, CHC's services can be made available to non-members to increase its viability.

India's agriculture sector is vast but fragmented, with a significant portion of the country's farmers holding small lands. For the small and marginal farmers, investing in modern equipment and advanced agricultural practices has traditionally been very expensive and also limited their productivity. FaaS addresses this challenge head-on by democratising access to these resources. Through affordable and scalable solutions, farmers can use technology to improve their yields, reduce input costs, and ultimately increase their profitability.

Farming-as-a-Service (FaaS)

Farming-as-a-Service (FaaS) is a service-based model that uses technology to provide agricultural services on a pay-per-use or subscription basis. Instead of requiring farmers to purchase expensive machinery, FaaS enables them to access cutting-edge tools and insights as and when needed. Agri-tech startups and digital platforms companies like EM3 AgriServices, DeHaat, and FarmWorks are already providing farmers with access to a range of FaaS solutions, from equipment rentals to crop advisory services. Moreover, mobile apps are simplifying the process for farmers, enabling them to book services, access data, and communicate with experts—all at their fingertips.

These startups are harnessing technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and big data analytics to deliver precise, actionable insights to farmers. For example, precision farming tools powered by drones and satellite imagery allow farmers to monitor their fields remotely, detect crop stress early, and take corrective action before problems escalate.

"Agriculture will become a service in India in the majority of sectors. The FaaS is already becoming popular in the form of drones and harvesters in India. It's not an easy and affordable option to buy high-tech agri machinery equipment for smallholding farmers, considering this fact, the high-tech farm machinery will become a service which they can avail on rent through FaaS for their sowing, tillage or harvesting activities", observed Dr T R Kesavan, Group Chairman TAFE.

FaaS in a Nutshell

- **On-Demand Equipment:** Farmers can rent modern machinery such as tractors, harvesters, and seeders, eliminating the need for costly investments.
- **Precision Farming:** Technology such as drones, satellite imagery, and sensors provides real-time data on soil health, weather conditions, and crop growth.
- **Agronomy Services:** Customised advisory services based on data-driven insights help farmers make informed decisions on planting, irrigation, fertilisation, and pest control.

Farmer-to-Farmer (F2F) model

While CHCs and FaaS startups are helping farmers by providing rental facilities of farm machinery and technology advisory support across the country, tractor ownership or F2F farm machinery support groups are becoming popular among the farmers' communities. These F2F support groups are channelling the growth of the rural economy as farmers get a good source of revenue by renting tractors to other farmers based on per day/hour.

While explaining more about the F2F model Dr T R Kesavan said, "In India, where several small-holding farmers are significant, farmers prefer rental farm machinery over buying farm machinery for pre- and post-harvest farming activities. Farmers who have bought the farm machinery can rent their tractors or harvesters to other farmers through the F2F model.

"TAFE is running a CSR project along the lines of the F2F model. Today two million farmers are working under this model and getting financial benefits while helping the other smallholder farmers. Farmers negotiate rental rates among their communities. In FY 2023 farmers across the country have earned Rs

With the entry of new technologies like AI, Data Science, Machine Learning, and Robotics, the farm mechanisation industry will become as complicated as the automobile sector. We will start seeing the change in the farm mechanisation industry in 10 years, where companies will be able to design small farm equipment for small 1-acre farms and multiple equipment which will work simultaneously in large quantities which is called the swabbing process. The future farm machinery will also cut down the need for power which is required in farming.”

Dr T R Kesavan, Group Chairman, TAFE

2,000 crore through the F2F model which is very inspiring. Indian farmers have set an example of a cooperative model of Farm machinery rentals,” he added.

Moving towards sustainable farm machinery

Farm machinery equipment, especially tractors account for 8 per cent of India’s annual diesel consumption, which contributes 6 per cent of agricultural CO2 emissions. Transitioning to options like e-tractors and CNG tractors is a significant step toward a more sustainable farm mechanisation industry. The adoption of sustainable farm machinery with renewable energy-powered charging infrastructure ensures net zero emissions and energy security in the country. The farm equipment manufacturing companies have launched different models of tractors according to the needs of farmers in various geographical locations which include dual fuel tractors (diesel+ CNG), e-tractors, and CNG tractors which will not only save fuel costs but also provide sustainable solutions to the farmers. Companies are looking at solutions for the challenges in e-tractor adoption such as affordable cost of batteries for e-tractors and long battery life to make it more cost-effective and sustainable solutions for smallholding farmers.

Need for customer-centric farm machinery

The PwC report further noted that the farm mechanisation in India is dominated by tractors. The overdependency on tractors is resulting in the lack of development of smaller and more affordable farm machinery suitable for small- and medium-sized farms in India. It has been estimated that the average annual utilisation of tractors in India is 500–600 hours. It is also the norm to use a tractor for at least 1,000 hours in a year to realise its full efficiency, mainly because there is a lack of suitable farm machinery for small plot sizes. Although power tillers showed some promise initially, challenges like moveability in tough terrains and operational difficulties resulted in low adoption. Therefore, there is an urgent need to develop and promote suitable machinery for small and marginal plot sizes.

The migration of male family members is very high in eastern Indian states, especially Bihar, and Jharkhand. Thus, there is a need to develop women-friendly agricultural machinery to address the challenge of high physical labour in the absence of male members in a farming household. The drudgery involved in agricultural activities needs to be removed through the development of small and precise machinery. The Indian Council of Agricultural Research (ICAR) has developed a list of farm equipment suitable for use by women farmers.

Along with the traditional farm machinery, new trends are emerging in the field of farm mechanisation which leverage the power of emerging technologies like AI. Such changes have enabled precision agriculture and the use of robotics, drone technology etc. These technological advancements have the potential to bring a new revolution in agriculture by greatly increasing efficiency and reducing human intervention.

While sharing his vision for the farm mechanisation industry by 2030-35 Dr Kesavan said, “With the entry of new technologies like AI, Data Science, Machine Learning, and Robotics, the farm mechanisation industry will become as complicated as the automobile sector. We will start seeing the change in the farm mechanisation industry in 10 years, where companies will be able to design small farm equipment for small 1-acre farms and multiple equipment which will work simultaneously in large quantities which is called the swabbing process. The future farm machinery will also cut down the need for power which is required in farming.”

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Can Green Power Replace Fossil-fueled Tractors?

JMK Research & Analytics estimated diesel tractors contributed 7.4 per cent of the country's yearly fuel consumption. The continuous use of diesel tractors has further caused greenhouse gas emissions to rise, with India thereby accounting for 7.3 per cent of world emissions, primarily from transportation and agriculture at the rate of 8.36 per cent and 14 per cent, respectively. The headwinds of growing global concerns on ecological balance and sustainability therefore influenced the transition towards the electrification of tractors and adoption of advanced electric tractors to reduce these emissions. The effective implementation of e-tractors in India will require a thorough and cooperative effort from several sectors. The Indian agricultural ecosystem's quicker adoption of e-tractors will promote early market development, giving homegrown producers the chance to expand their worldwide leadership in e-tractor production and open up export markets.

The concept of electric tractors (e-tractors) however is still at a nascent stage in India. However, over time, the nation shall embrace and advance in electrification, creating ample opportunities for the e-tractors market to develop soon.

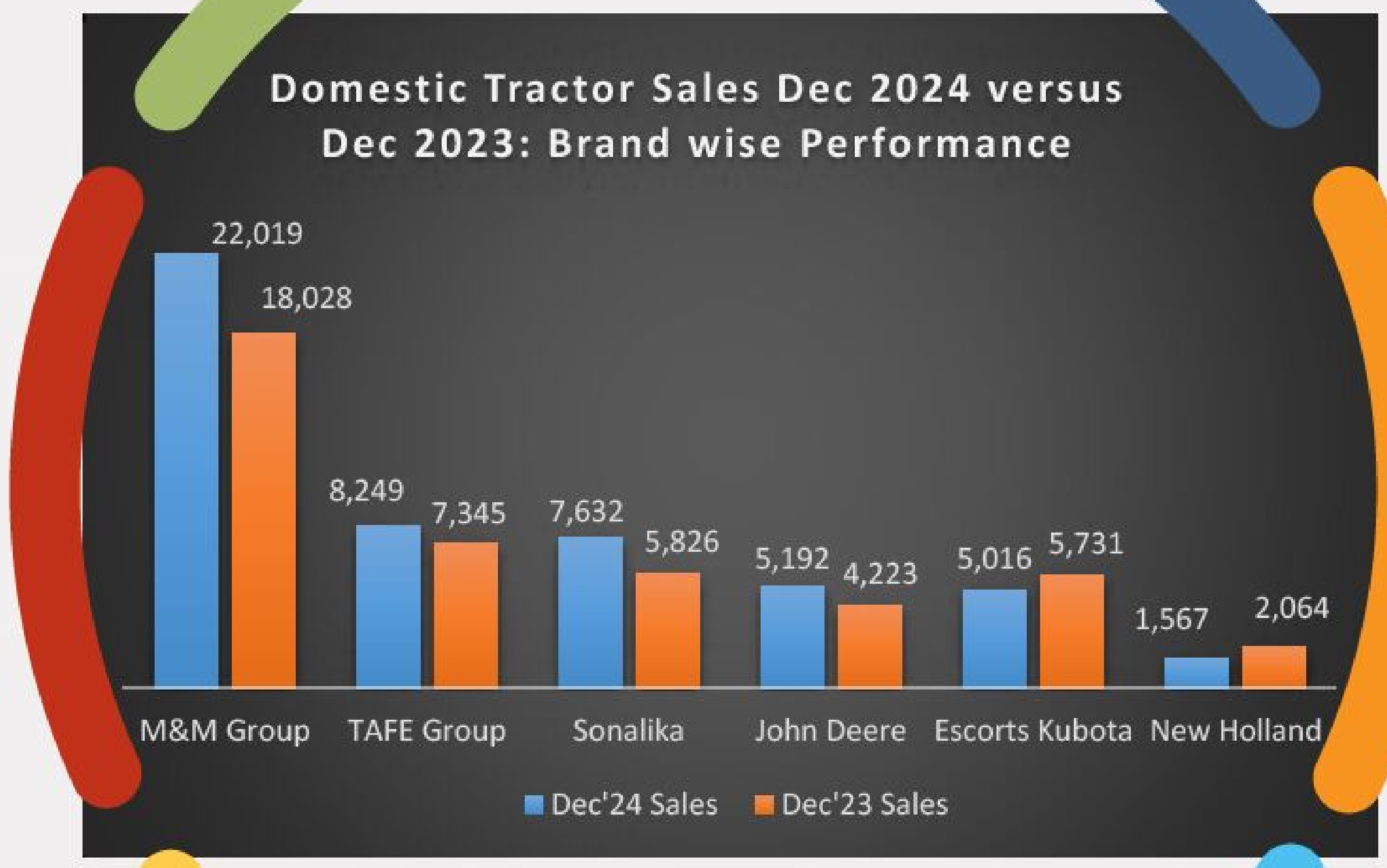
In India, diesel tractors account for around 8.81 lakh registered units or 3.57 per cent of the total vehicle population in FY2024. The country continues to be a dominant player in the segment thereby exporting 10.33 per cent of the manufactured tractors to the international markets.

The diesel tractor market has eventually risen at a CAGR of 8.29 per cent between FY2016 and FY2024, indicating an enormous prospective in this sector. The top five companies made up roughly 85 per cent of the market share in FY2024.

With the most tractor registrations and the highest number of units sold between FY2014 and FY2024, Uttar Pradesh emerged as the state with the largest agricultural base, according to Vahan Database. The extent of automated farming in India's key agricultural centres is demonstrated by the high tractor sales volumes in Madhya Pradesh, Rajasthan, Maharashtra, and Telangana. The growth from FY2023 to FY2024 is marginally lower at 8.84 per cent, whereas the annual average growth rate (AAGR) from FY2022 to FY2023 is 10.12 per cent (VAHAN 2024). The statistics demonstrate an apparent halt but overall steady growth. The country's agricultural diversity is reflected in the geographic distribution of tractor sales, with states with intensive farming, such as Uttar Pradesh, exhibiting greater adoption rates.

A diminishing labour force and expanding food demand represent two primary challenges facing India's agriculture sector, necessitating production quality and quantity increases. Although increasing farm mechanisation is

According to Sources, December 2024 tractor sales in India grew by 13.97%, with M&M leading and Sonalika achieving 31% growth. M&M Group pioneered with 22,019 units, a 22.14% growth, and gained 2.89% market share. Escorts Kubota and New Holland witnessed major declines of 12.48% and 24.08%, respectively



M&M GROUP (MAHINDRA)

Pioneered the market with exceptional growth, selling **22,019 tractors** in December 2024

TAFE

Moderate growth, selling **8,249 tractors** in December 2024—a 12.31% increase from 7,345 units in December 2023

SONALIKA

Achieved remarkable growth, with **7,632 tractors** sold in December 2024, a 31.00% increase from 5,826 units in December 2023

JOHN DEERE

Achieved impressive growth, selling **5,192 tractors** in December 2024, up 22.95% from 4,223 units in December 2023

ESCORTS KUBOTA

Reported a decline, selling **5,016 tractors** in December 2024—12.48% less than the 5,731 units sold in December 2023

NEW HOLLAND

Faced significant challenges, with sales dropping by 24.08 %. The brand sold **1,567 tractors** in December 2024 compared to 2,064 units in December 2023

Overall total **50,986 tractors** were sold in 2024 as compared to 44,735 units in December 2023

necessary to boost productivity, it has boosted the use of diesel-powered tractors, which has raised the cost of operation and carbon emissions. The use of e-tractors offers a practical way to deal with these problems sustainably. As previously mentioned, e-tractors provide a sustainable substitute by lowering reliance on fossil fuels and greenhouse gas emissions. They additionally bring about a more economical cost of operation by requiring less fuel and maintenance. The drop in diesel demand may also alleviate the fiscal burden on the government, by providing fossil fuel subsidies.

As of June 2024, 127 e-tractor units have been registered cumulatively in India, as per JMK Research; including imported e-tractor vehicles from other countries and sales of prototype e-tractor vehicles built in India. In terms of state-wise deployment, the highest number of e-tractors has been registered in key agricultural states such as Haryana and Punjab.

Silent Strength, Green Future

One of the primary barriers in terms of accessibility is the high initial cost of e-tractors, making them less accessible, particularly for small and marginal farmers. This calls for subsidies or dedicated policy support, to check the high upfront cost deterring adoption. There is a major policy gap because e-tractors are now excluded from FAME I and II, which support electric vehicles (EVs). The ambiguity surrounding e-tractors' operational performance is another major obstacle. When compared to diesel tractors, many farmers and stakeholders are unsure of the e-tractors' long-term advantages, dependability, and efficiency. Furthermore, a barrier to adoption is the insufficient infrastructure for charging, particularly concerning the fast-charging system (FCS). Supporting this transformation will be challenging for rural communities with low resources because of the high costs associated with setting up such infrastructure. Last but not least, e-tractors are often unknown to farmers and other stakeholders, and the absence of qualified drivers who are trained to use these new technologies is impeding their potential adoption.

India could lead the world in e-tractor production, opening up export markets and spurring innovation in sustainable farming. Rural communities' reliance on fossil fuels would be lessened and their energy security would be improved by integrating e-tractors with renewable energy sources, which are encouraged by programmes like PM KUSUM. Indian agriculture will have a greener future thanks to this shift, which is in line with both national and international sustainability goals. Additionally, e-tractors have the potential to boost the economy and create jobs. From manufacturing to maintenance, e-tractors may create jobs throughout the supply chain by supporting new sectors and technology.

In addition to modernising rural India, this change may result in better rural infrastructure, including better connectivity, energy distribution, and transportation in underprivileged areas. The advancement of smart farming technologies due to the adoption of e-tractors would further enhance precision agriculture, optimise resource usage, and boost overall farm productivity, paving the way for more efficient and sustainable farming practices.

Using e-tractors to adopt smart farming technology will lay the foundations of precision farming, maximise resource use, and increase farm productivity overall, opening the door to more sustainable and effective agricultural methods. Intending to promote the use of e-tractors in the state, the Industries & Commerce Department Government of Haryana has provided a 50 per cent price incentive, up to Rs 5 lakh, for the first 1000 e-tractors. On the other hand, the Government of Telangana has also announced Road tax and registration exemption for applicable e-tractors in 2020.

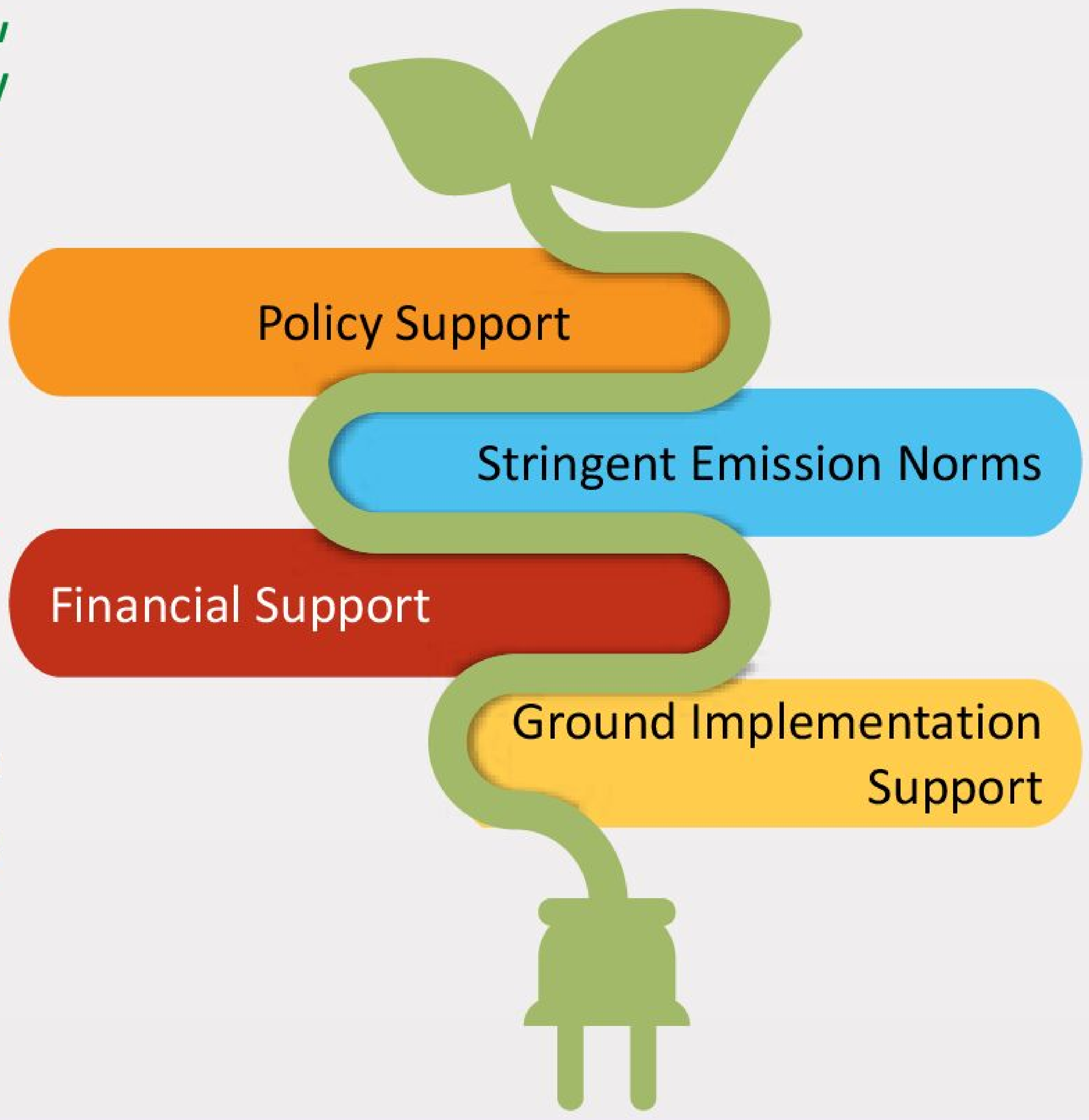
Transforming Agri Economics with E-Tractors

When it comes to developing sustainable business models for e-tractor adoption in India, Custom Hiring Centres (CHCs) can be a game changer by renting out e-tractors to farmers, which eliminates the need for a large upfront investment. In a similar vein, Farmer Producer Organisations (FPOs) can buy and maintain e-tractors as a group, guaranteeing best practices and dividing the expenses among members. Leasing, which lowers the barrier to entry by allowing farmers to pay over time, was another approach that was investigated. Additionally emphasised was the tractor-as-a-service (TaaS) or pay-per-use model, which allows farmers to just pay for the hours or tasks they require, maximising flexibility and lowering costs.

Additionally, to boost adoption and innovation, incubation centres have been recognised as useful hubs for building sustainable business models and supporting innovation in the e-tractor sector. Using green financing tools will increase the financial viability of e-tractors by offering advantageous loan conditions correlated with environmental performance. By utilising e-tractors to cut emissions, farmers can access carbon credits to generate extra income, making the switch not only environmentally beneficial but also profitable. These various business models assist the wider deployment of e-tractors throughout India's agricultural environment by distributing operational and financial risks.

Another significant possibility for sustainability in the future was seen as the integration of sources of clean energy into the rural grid for charging. In agricultural areas, the ease and viability of utilising e-tractors for routine farming tasks are restricted by the absence of charging outlets. Furthermore, this

Framework for Supporting E-Tractor Adoption



Including electric tractors in the new FAME-III Policy

- Alignment of policy roadmap with national priorities for decarbonization and farm mechanization
- Establishing testing standards similar to those for diesel tractors
- Drawing parallels from policy efforts such as the Bharat Zero Emission Trucking (ZET) Policy Advisory

Subsidy support for e-tractor adoption

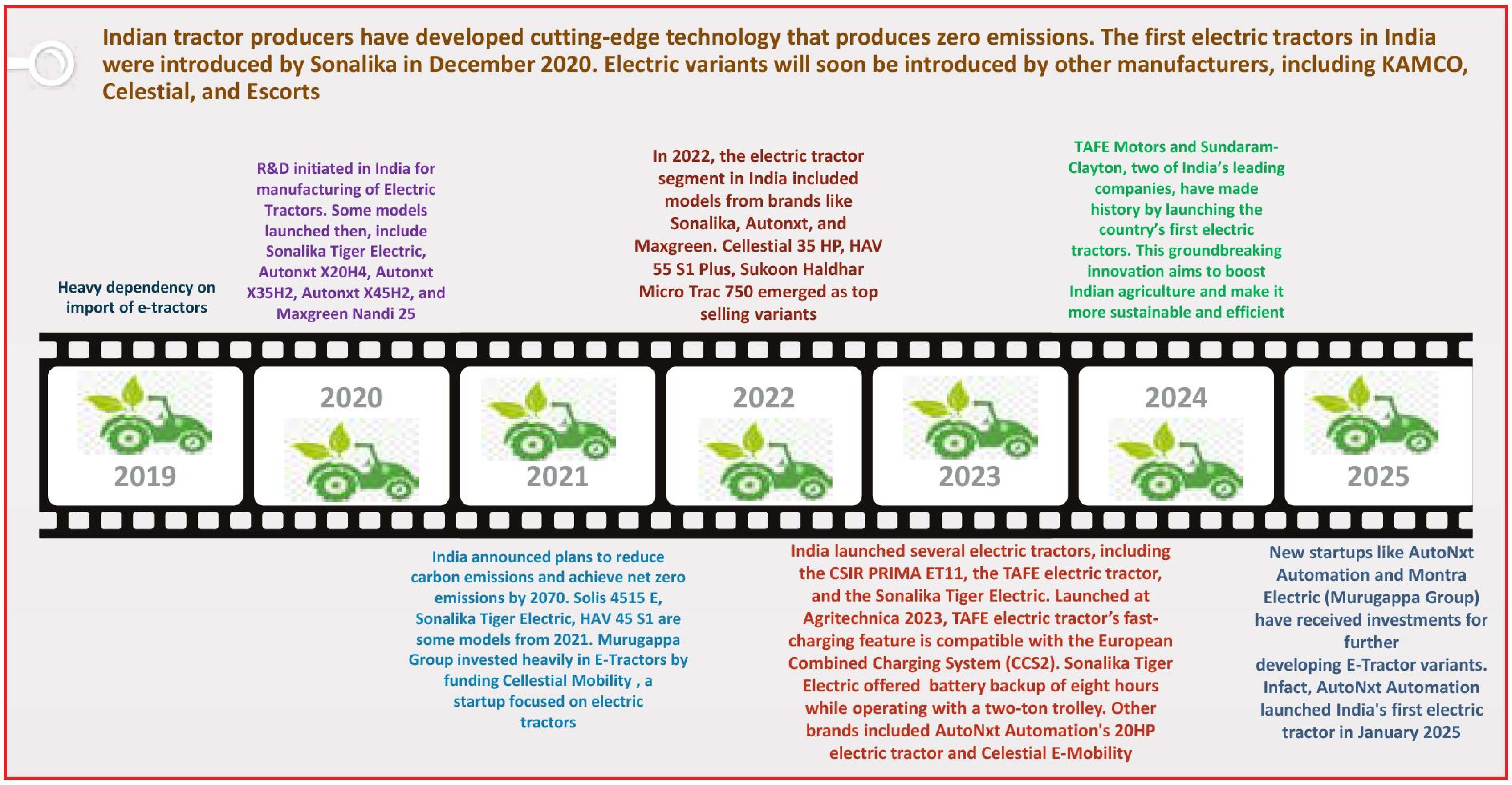
- Existing programs like FAME, PM KUSUM, Pradhan Mantri Kissan Samman Nidhi (PM KISAN), and the Sub-Mission on Agricultural Mechanization (SMAM) have been instrumental in advancing electric vehicles and agricultural machinery. However, SMAM now concentrates on diesel tractors even though it offers up to 80% subsidies on agricultural equipment
- Electric tractors currently pay the same 12% tax rate as diesel tractors. A slight tax relief could result in a large boost in sales growth
- Financial support through low-interest loans from NABARD, tax rebates and carbon credits

Implementation of strict emissions standards for agricultural machinery

- Intoduction of emission norms in line with Stage 5 emissions standards set by European countries thereby encouraging the transition from diesel to electric tractors and boosting market demand
- Regarding OEMs, the government might require them to provide a certain quantity of EV models annually in addition to their ICE goods

Implementing scalable pilots for feasibility analysis

- The operational effectiveness and dependability of e-tractors need to be evaluated in practice before they can completely replace diesel-powered tractors, even though financial assistance and regulatory incentives can hasten adoption.
- With the capacity to directly compare the cost-effectiveness, operational performance, and sustainability of electric and internal combustion engine tractors, scalable e-tractor pilot deployment programs are crucial in this regard



Indian tractor producers have developed cutting-edge technology that produces zero emissions. The first electric tractors in India were introduced by Sonalika in December 2020. Electric variants will soon be introduced by other manufacturers, including KAMCO, Celestial, and Escorts

Heavy dependency on import of e-tractors

R&D initiated in India for manufacturing of Electric Tractors. Some models launched then, include Sonalika Tiger Electric, Autonxt X20H4, Autonxt X35H2, Autonxt X45H2, and Maxgreen Nandi 25

India announced plans to reduce carbon emissions and achieve net zero emissions by 2070. Solis 4515 E, Sonalika Tiger Electric, HAV 45 S1 are some models from 2021. Murugappa Group invested heavily in E-Tractors by funding Cellestial Mobility , a startup focused on electric tractors

In 2022, the electric tractor segment in India included models from brands like Sonalika, Autonxt, and Maxgreen. Cellestial 35 HP, HAV 55 S1 Plus, Sukoon Haldhar Micro Trac 750 emerged as top selling variants

India launched several electric tractors, including the CSIR PRIMA ET11, the TAFE electric tractor, and the Sonalika Tiger Electric. Launched at Agritechnica 2023, TAFE electric tractor's fast-charging feature is compatible with the European Combined Charging System (CCS2). Sonalika Tiger Electric offered battery backup of eight hours while operating with a two-ton trolley. Other brands included AutoNxt Automation's 20HP electric tractor and Celestial E-Mobility

TAFE Motors and Sundaram-Clayton, two of India's leading companies, have made history by launching the country's first electric tractors. This groundbreaking innovation aims to boost Indian agriculture and make it more sustainable and efficient

New startups like AutoNxt Automation and Montra Electric (Murugappa Group) have received investments for further developing E-Tractor variants. Infact, AutoNxt Automation launched India's first electric tractor in January 2025

problem is made worse by frequent power outages in rural areas, since e-tractors require steady, dependable electricity to be charged. The shift to sustainable agricultural techniques is slowed down by these infrastructure deficiencies, which also discourage prospective purchasers from purchasing e-tractors and reduce the effectiveness and productivity of farming operations.

Rural charging stations might be powered by programmes like PM KUSUM, which encourages the use of solar energy for agricultural purposes. This would lessen the strain on traditional electricity sources. Long-term operational expenses would be reduced by this integration, which would also serve India's larger renewable energy objectives by establishing a self-sufficient charging network that facilitates rural electrification and e-tractors. The switch to e-tractors can also support India's efforts towards sustainability and energy independence by utilising renewable resources like solar electricity.

India's sizable diesel tractor sector offers a substantial electrification opportunity.
There is a lot of room for market expansion by creating e-tractor models that can rival their ICE tractor (a tractor that uses an internal combustion engine (ICE). In India, there are just a few commercially available e-tractor models, but due to a lack of demand, production has not yet begun. With a few models having advanced past the development stage, certain ICE tractor Original Equipment Manufacturers (OEMs) are gradually making their way into the e-tractor market.

The effective implementation of e-tractors in India will require a thorough and cooperative effort from several sectors. India can establish itself as a pioneer in sustainable agricultural mechanisation by tackling important issues with initiatives for early market development, creative business models, expandable pilot programmes, and equitable finance frameworks. In addition to increasing production, this collaborative strategy supports both national and international decarbonisation objectives, guaranteeing a more promising and sustainable future for Indian agriculture. Additionally, the Indian agricultural ecosystem's quicker adoption of e-tractors will promote early market development, giving homegrown producers the chance to expand their worldwide leadership in e-tractor production and open up export markets.

India's e-tractor sector is still in its infancy because of a lack of infrastructure, demand, and legislative backing. The government must give consumers appropriate purchase incentives to increase demand, which will motivate OEMs to launch new models and speed up product development. Incentives for manufacturers should also be provided in order to allay the financial worries of entrepreneurs investigating this novel technology.

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“Within the next 8-10 years, electric tractors will replace 50% of the diesel tractors”

ANOOP SRIKANTASWAMY, Co-founder and CEO, Moonrider

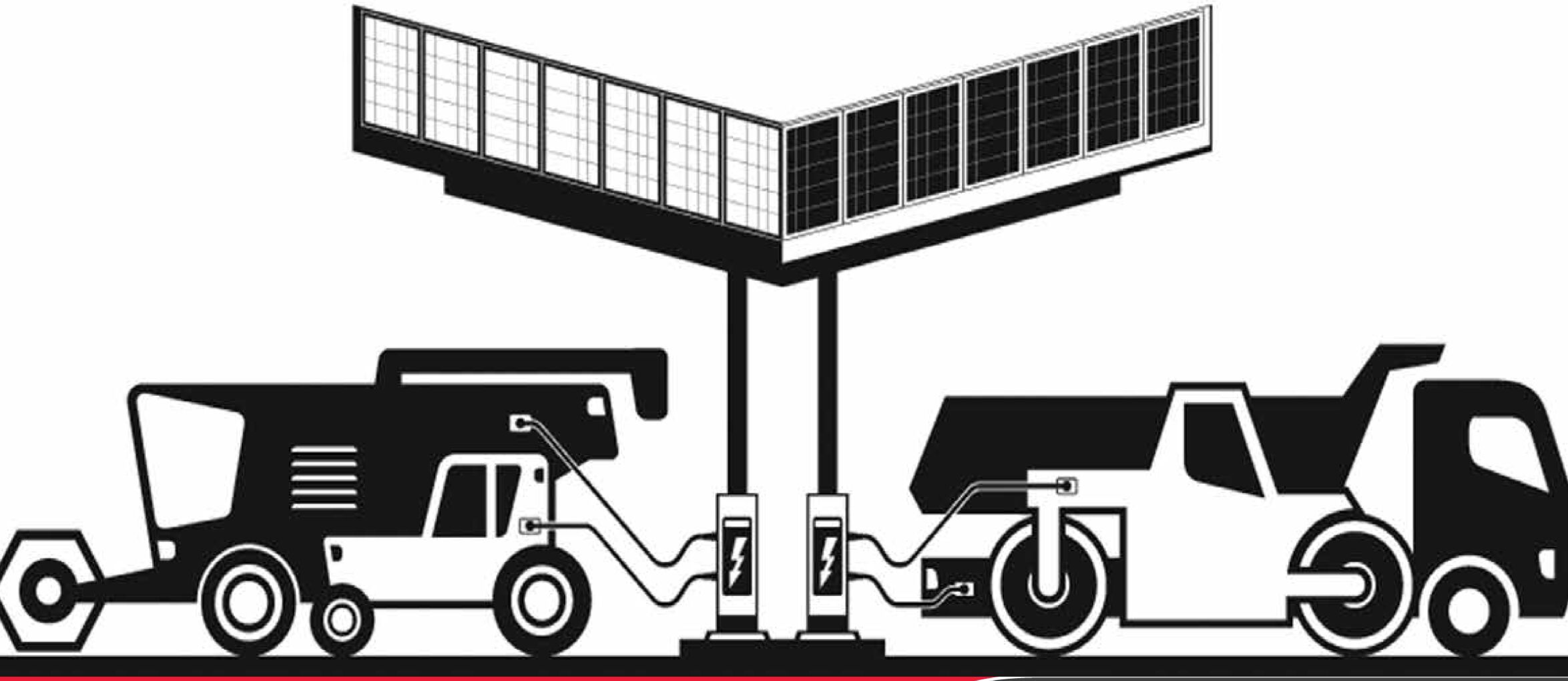
Moonrider has recently been successful in securing a venture round of funding of $2.2 million (Rs 19 crore). This funding round was jointly led by AdvantEdge Founders and Micelio Technology Fund, in addition to a considerable number of angel investors. Moonrider is an Electric Tractor Technology Company founded in 2023, focused on developing heavy-duty electric tractors (e-tractors) designed to reduce farming costs and improve operational efficiency for farmers and fleet operators. In an interaction with AgroSpectrum, Anoop Srikantaswamy, Co-founder and CEO of Moonrider, shared trends and future of "Indian Electric Tractor Industry." Edited excerpts:

What is the current market size of the Electric Tractor Market in India?

India is the largest tractor market with 1 million units sold last year amounting to $17 billion in revenue. Globally it is a $30 billion market with 1.8 million units sold. Pheonix Research, an international market research consultancy, projects that the e-tractors market in India will grow at a healthy compound annual growth rate (CAGR) of 21.5 per cent between 2021 and 2027.

How do you envisage the future of e-tractors in the Indian agriculture sector?

The agricultural industry is responsible for 18 per cent of India's gross domestic product, and e-tractors will play a significant part in the development and progress of the sector from this point forward. Farm mechanisation will be made possible by e-tractors, which will also contribute to an increase in farm production and profitability. Within 8-10 years, e-tractors will replace 50



per cent of the diesel tractors that are currently used on farms. When it comes to the promotion of environmentally friendly assets that will lead to the widespread use of e-tractors, we also anticipate more cooperation from the government.

Not only do e-tractors assist in encouraging sustainable agricultural techniques, but they also help reduce the carbon footprint of farmers. The consumption of diesel-by-diesel tractors in India accounts for 7.4 per cent of the country's annual diesel consumption, which results in increased carbon emissions.

What are the major challenges of the e-tractor sector and how can they be resolved?

We will need to assist users in comprehending and becoming aware of the considerable benefits that are offered, which will ultimately lead to the broad adoption of e-tractors. This is necessary for any new technology or product launch. Another area that presents difficulties in the present day is the financing of the acquisition of e-tractors. It will be easier to accelerate the adoption of e-tractors if there is more participation from nationalised banks that offer favourable interest rates. The supply of electricity in particular locations may be uneven; fixing this issue will make it simpler for farmers to use e-tractors that are suitable for their requirements. With that being said, the backing of the government is necessary; subsidies and policies that are advantageous will assist in increasing the adoption and utilisation of e-tractors.

You have mentioned that your mission is enhancing farm profitability. Can you elaborate on that?

From the perspective of farm equipment, one must lower the operating costs and the initial capital expenditure to improve the profitability of the farm. More money is earned and saved by farmers as a result of this. The fact that our e-tractors are 70 per cent less expensive to operate and maintain has a direct influence on the profitability of farms and the income of farmers. Further, Moonrider e-tractors, such as our 75-horsepower (HP) e-tractors, are priced similarly to their diesel equivalents, which makes them an appealing prospect for consumers and farmers alike.

On the cost front, how economical are these e-tractors as compared to conventional ones?

We offer tractors that are priced similarly to diesel alternatives in terms of the initial investment required. And the costs of operation are significantly reduced. For instance, the cost of operating a diesel tractor with 75 HP can reach up to Rs 1300 per hour, whereas the cost of operating our e-tractor with 75 HP per hour is Rs 300. To put it another way, our e-tractors are 70 per cent less expensive to own and operate than their gasoline-powered counterparts.

Alterations in or increases in the cost of fuel have a substantial impact on the revenue of farmers. The cost of e-tractors, on the other hand, can be reduced to a fraction of the original cost.

What schemes and promotion campaigns have you devised so that more farmers can get their hands on your machines?

At the moment, we are a business-to-business (B2B) company, which means that we do not sell tractors to farmers directly. To make our e-tractors available to farmers, we have formed partnerships with rental fleet owners in India and Africa. These fleet owners will be the recipients of our Moonrider e-tractors, and we will, in turn, rent our tractors to them.

What are your expectations from the government?

To lessen the country's reliance on fossil fuels and the amount of pollution that is produced, the government of India is actively promoting the purchasing of electric vehicles (EV). Several measures have already been implemented by the government to assist EV players, both in terms of policy and in terms of capital allocation through subsidies. When it comes to the government's efforts to promote sustainable agriculture, the utilisation of tractors that are kind to the environment is an excellent fit. Through the deployment and operation of pilots, we are thrilled to collaborate with both the federal government and state governments.

Nitin Konde

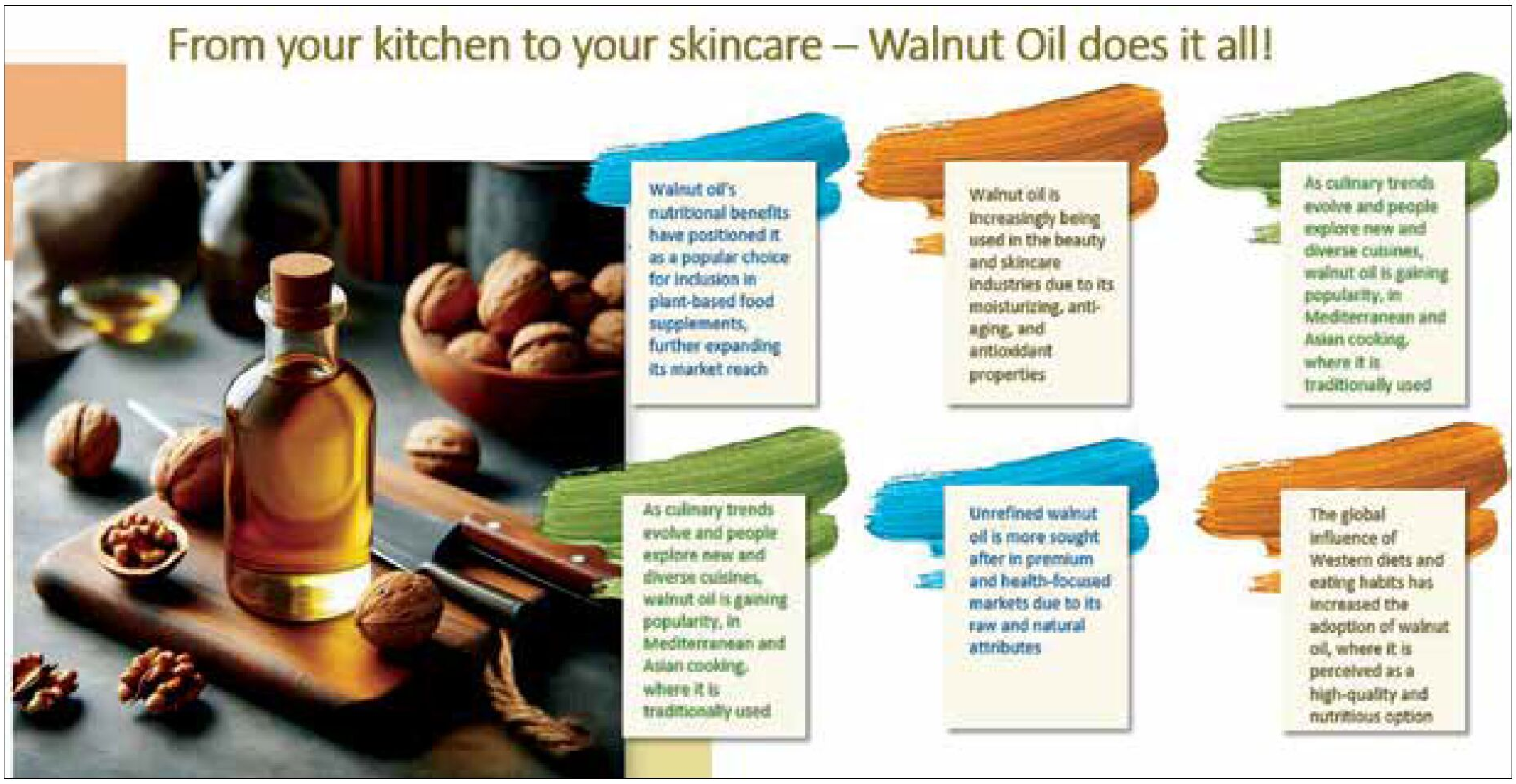
Growing Trend of Walnut Exports from India: A Global Perspective

The Indian appetite for walnuts has continued to rise since COVID-19, as the country's rapidly rising population learns about its health benefits. Traditional and modern retail shops, including India's e-commerce sector, are also helping to boost consumer demand. Besides exports, walnut consumption in India has the potential for growth by 50 per cent annually. For walnut exports from India to be successful, exporters need to adopt a multifaceted strategy that focuses on quality improvement, market expansion, value-added product development, supply chain efficiency, and building brand recognition.

According to Mordor Intelligence, the Walnut market size is anticipated to be $9.26 billion in 2025, rising to $11.77 billion by 2030, with a CAGR of 4.9 per cent between 2025 and 2030. The walnut industry is continuously developing, fuelled by rising demand for healthful and nutritious foods, particularly due to walnuts' high omega-3 content and well-known health benefits. The global production of walnuts is concentrated in a few major regions, with China, the United States, and Chile leading the way.

According to the United States Department of Agriculture, China is the largest producer, accounting for more than half of global walnut production, with 1.4 million metric tonnes predicted in 2023. The country's extensive walnut growing is assisted by favourable weather and government incentives to boost nut output. The United States, particularly California, is another major supplier, accounting for more than 30 per cent of global walnut production each year, according to the Dried Fruit Association of California.

Walnuts are widely consumed in North America, Europe, and parts of Asia Pacific. The United States and China are not only major producers, but also significant consumers. The walnut oil sector is also growing, driven by demand from the cosmetics and skincare industries, which use walnut oil for its moisturising and anti-aging properties. Furthermore, walnut meal, a byproduct of oil manufacturing, is becoming more popular in the food business as a protein-rich ingredient. According to Fact.MR, the global walnut oil market has been estimated at $1.4 billion in 2024 and projected to reach $1.95 billion by



From your kitchen to your skincare – Walnut Oil does it all!

Walnut oil's nutritional benefits have positioned it as a popular choice for inclusion in plant-based food supplements, further expanding its market reach

Walnut oil is increasingly being used in the beauty and skincare industries due to its moisturizing, anti-aging, and antioxidant properties

As culinary trends evolve and people explore new and diverse cuisines, walnut oil is gaining popularity, in Mediterranean and Asian cooking, where it is traditionally used

As culinary trends evolve and people explore new and diverse cuisines, walnut oil is gaining popularity, in Mediterranean and Asian cooking, where it is traditionally used

Unrefined walnut oil is more sought after in premium and health-focused markets due to its raw and natural attributes

The global influence of Western diets and eating habits has increased the adoption of walnut oil, where it is perceived as a high-quality and nutritious option

2034, at a CAGR of 6.5 per cent. Furthermore, technological advancements in processing and packaging have contributed to the country's large exports, since walnut manufacturers in the United States employ improved hulling, drying, and packaging techniques to extend the shelf life of walnuts. As a result, while China is the world's leading producer of walnuts, the United States has established itself as a top exporter due to superior quality, product variety, and access to global markets.

India is the world's eighth largest producer in walnuts. The state of Jammu and Kashmir is the leading walnut-producing region in India, contributing a significant portion of the country’s total production. The cool, temperate climate of the region is ideal for walnut cultivation. As per the India Brand Equity Foundation, evolving consuming preferences and rapid urbanisation are expected to increase India’s food consumption to $1.2 trillion by 2025-26, thereby accelerating the demand for processed walnuts in the country. In fact, walnut exports can be a game changer towards attracting of foreign currencies owing to a number of reasons:

Firstly, walnuts are used in a variety of industries, including food, pharmaceuticals, and cosmetics. They are popular in snacks, desserts, salads, and even cooking oils, increasing the global market for the nut.

Secondly, walnuts produced in India, especially in regions like Jammu and Kashmir, are often more affordable compared to those grown in other major walnut-producing countries like the United States and China. This cost advantage makes Indian walnuts competitive in international markets, especially in price-sensitive regions such as Southeast Asia and the Middle East.

Thirdly, India’s proximity to markets in the Middle East and Southeast Asia provides logistical advantages, making the shipping process more cost-effective and reducing transit time. This helps in maintaining the freshness and quality of the walnuts during transportation.

Fourthly, the Indian government provides incentives and subsidies to walnut farmers and exporters under various export promotion schemes like the Merchandise Exports from India Scheme (MEIS), thereby reducing the financial burden on exporters and increasing the profitability of walnut exports.

Fifthly, the export of walnut oil, walnut-based snacks, and walnut-derived products adds value to raw walnuts contributing towards higher profit margins compared to raw walnuts, making walnut exports more profitable.

The Indian appetite for walnuts has continued to rise since COVID-19, as the country's rapidly rising population learns about its health benefits. Kernel colour is crucial to Indian customers. Consumers like lighter skin kernels that are routinely bleached. Traditional and modern retail shops, including India's e-commerce sector, are also helping to boost consumer demand.

According to industry projections, walnut consumption in India has the potential for growth by 50 per cent annually. In-shell walnuts continue to be in high demand and are mostly offered in conventional markets and retail. However, shelled walnut kernels are becoming increasingly popular due to their widespread use as a snacking nut and in household cuisine. It is observed that households consume over 70-75 per cent of India's walnuts, with more than half consumed during the festive season (October-November).

Furthermore, walnuts' culinary versatility, which is utilised in a variety of Indian meals ranging from sweets to savouries, as well as the growing usage of walnut oil in India's flourishing cosmetics industry, contribute to its popularity. The convenience and broad reach of e-commerce and quick-commerce platforms have propelled walnut sales across multiple geographic locations. Supermarkets are increasingly allocating shelf space to meet surging demand for tree nuts, particularly walnuts.

Nature’s Nut, Grown in India, Shared Globally

Speaking of policy reforms, walnut imports are permitted without any quantitative limits under India's Open General License scheme. In 2023, the retaliatory duty of 20 per cent imposed on walnuts of US origin was lifted to promote U.S. walnut exports to India, despite the fact that in-shell and shelled walnut imports will face a 100 per cent basic customs duty.

According to Trade Data Monitor, FAS New Delhi Research, India’s main supplier of walnuts is Chile, which commands a substantial market share of 59 per cent. A recent study conducted by GAIN pointed out that traders undervaluing walnuts across different origins, particularly those from Chile making walnuts from the United States less competitive and lowering domestic costs. Trade sources have therefore recommended the imposition of the tariff on a quantity basis (per kilogram), as is done with almond imports to protect the domestic industry from the unfair price advantage that other sources enjoy, while also assisting the Indian government in recovering actual import duty income losses. The massive influx of cheap walnuts into the Indian market has crushed and depressed the prices of indigenous walnuts, causing the livelihoods of local walnut farmers to suffer.

Crafting Value, One Walnut at a Time

Despite Government initiatives to promote walnut exports, walnut exporters from India face several challenges that can affect the profitability and growth of the industry. These challenges span across production, quality control, logistics, and market access as well as stiff competition from major walnut producers like the United States (California), China, and Iran as they are equipped with well-established supply chains, better access to advanced farming technologies thus often being able to offer walnuts at a lower price. To ensure the success of walnut exports from India, exporters must adopt a strategic approach that addresses key challenges, enhances the quality of the product, and maximises market opportunities. Here are several strategies that can help Indian walnut exporters succeed:

First, implementing stringent quality control processes across sorting, grading, and packaging of walnuts to meet international standards, assisting Indian walnut exporters in obtaining globally recognised certifications, such as Global GAP, ISO certifications, or Organic Certification, to assure buyers of the quality and safety of the product and investing in modern infrastructure to improve the processing efficiency and product quality can ensure better revenue for walnuts in international markets.

Second, exporters can add value by processing walnuts into oil, roasted walnuts, walnut-based snacks, and other value-added products along with neutraceuticals for enhancing profit margin.

Third, diversification of export markets and leveraging Free Trade Agreements (FTAs) can assist in mitigating risks associated with sudden changes in demand or trade barriers in any one market.

Fourth, establishing modern storage facilities, including cold storage, can help extend the shelf life of walnuts and reduce post-harvest losses. Proper handling during transportation and storage ensures that walnuts reach international markets in optimal condition. At the same time, streamlining the logistics and supply chain through efficient transportation, timely deliveries, and minimising customs clearance issues can significantly reduce costs. Collaboration with reliable logistics partners will help ensure the smooth export process.

Fifth, in order to stand out in international markets, Indian walnut exporters must invest in branding. Creating a unique brand identity and telling the story of Indian walnuts, their quality, and the regions they come from can help build trust and increase demand. This also involves participating in international trade fairs and exhibitions. Leveraging digital platforms, including e-commerce websites, social media, and B2B portals, can help create awareness and drive sales. Engaging in online marketing and showcasing the product through digital media can help reach global buyers more effectively. Sharing the history, culture, and sustainable farming practices associated with walnut cultivation in India (especially from renowned regions like Jammu and Kashmir) can attract consumers who are interested in premium, traceable, and ethically produced products.

Sixth, focus should be laid on pricing strategy as a crucial component in the competitive walnut export market. Indian exporters should be adept at negotiating contracts that ensure profitability while being competitive in pricing, taking into account production costs, export duties, and market prices in destination countries.

For walnut exports from India to be successful, exporters need to adopt a multifaceted strategy that focuses on quality improvement, market expansion, value-added product development, supply chain efficiency, and building brand recognition. By addressing challenges proactively and staying adaptable to global trends and market demands, Indian walnut exporters can carve a strong niche in the global market, boosting their competitiveness and profitability. AS

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“Ensuring the product meets consumer expectations in terms of strength and usability is critical for wider adoption”

AVINASH RAO, CEO & Co-Founder, Agrileaf

In December 2024, Agrileaf, one of India's leading producers and exporters of areca leaf dinnerware, secured funding of Rs 16 crore from Capital A and Samarsh Capital. With the additional funding, Agrileaf is expanding its production capacity thereby enhancing its line of biodegradable dinnerware and packaging, and promoting community involvement. Located in Dakshina Kannada, the company's cutting-edge facility integrates sophisticated robotics, AI-powered quality control, and an effective areca leaf harvesting network creating over 1,000 job possibilities, which supports the economic growth of rural areas. In an interview with AgroSpectrum, Avinash Rao, CEO & Co-Founder, Agrileaf highlighted the innovations towards ensuring ecological balance and sustainability as well as the impact of such remarkable milestones in rural development. Edited excerpts:

What is the process involved in turning the areca palm leaves into disposable plates and food platters?

We get dried, fallen areca sheaths from nearby farmers, who receive a reasonable payment for the raw material. The collected dry areca leaf sheaths are soaked in water, cleaned, and positioned so that the water drains entirely. After being cleaned, the leaves are pressed into moulds with different sizes and eye-catching patterns based on the needs of the market. A hot moulding procedure is used to sterilise the clean fibre and give the finished product its final shape. Before being packaged and shipped, these biodegradable plates undergo a last quality check and finishing process. After being packaged per the needs of the customer and shipped securely, the fallen leaf plates are still usable six months later. Mostly women farmers are involved in this activity. We pay them between Rs 15,000 and Rs 20,000 per annum.

During processing, the leaves are washed, and hot pressed in moulds to give shape to the plate. Thus the plates become rigid naturally. In arecanut plantations as such, no harmful chemicals are sprayed. Mostly Copper Sulphate is sprayed as a fungicide. Often lime is also used. The natural layer of film on the leaf sheath keeps the product USP on top.

What are the key environmental benefits of using areca palm leaves compared to traditional plastic or paper plates?

Compared to paper plates where huge energy is wasted to obtain the final product, arecanut plates are manufactured using green energy without depleting water resources or using harmful chemicals for processing. Moreover, areca palm leaf plates are entirely biodegradable and decompose naturally, unlike plastic plates which can take hundreds of years to break down. This reduces landfill waste and the environmental footprint of disposable products. The leaves are collected without harming the tree, and no chemicals or artificial fertilisers are required in their cultivation. This makes the production of these plates more environmentally friendly compared to the resource-intensive processes involved in making plastic or paper plates.

As discussed earlier, the production process of areca palm leaf plates typically involves minimal processing, using no harmful chemicals or energy-intensive machinery. In contrast, plastic plate production relies on petrochemicals and energy-heavy processes, while paper plates require significant water and energy resources for pulp production. Unlike paper plates, which contribute to deforestation, areca palm leaf plates are made from fallen leaves, ensuring no trees are cut down. The leaves naturally shed and are collected, avoiding any additional strain on forests. Areca palm plates are chemical-free, unlike some paper plates that may be coated with wax or synthetic chemicals to make them waterproof or more durable. This ensures that the plates are safe for both human use and the environment. Speaking from a sustainability point of view, the plates can be composted, contributing to soil health rather than adding to waste. Paper plates may be compostable, but they often contain additional coatings that can hinder the composting process, whereas areca plates are entirely natural. Thus, areca palm plates are an eco-friendly alternative that supports sustainability, reduces waste, and helps protect ecosystems.

Areca palm leaf plates offer versatility and functionality suitable for various occasions and food types. They are heat-resistant, allowing them to withstand hot dishes without warping or leaching harmful chemicals. This makes them ideal for serving both hot and cold food items at events, parties, and restaurants.

Are Agrileaf products available in international markets, or do they serve the local or national market in India?

Agrileaf products, which are made from areca palm leaves, are primarily manufactured in India, where the company is based. However, they have expanded their reach to international markets as well. The growing demand for eco-friendly, biodegradable alternatives to plastic and paper products has encouraged Agrileaf to export its products globally. These products are often available through online platforms, direct export channels, and partnerships with international distributors. While India remains a significant market for Agrileaf products, the company has also tapped into international markets, including regions in Europe, the United States, and the Middle East, where there is a rising awareness and preference for sustainable, environmentally friendly alternatives. Therefore, Agrileaf products are not limited to the local or national market in India and have begun to cater to international consumers and businesses seeking eco-conscious products.

As of date, 90 per cent of revenue comes from the USA. We plan to establish our footprints in Japan as well. As far as growth in the domestic market is concerned, extra marketing cushion in India is not available as arecanut plates are perceived as high-volume price commodities. We need better warehouses to distribute our products to different cities in India which might further add up to the cost of production. On the other hand, for export, it is an immediate dispatch which saves our cost to some extent.

What are the challenges Agrileaf faces in scaling its business and maintaining sustainability as demand for eco-friendly products grows?

Despite growing interest in sustainable products, many consumers and businesses are still unaware of the environmental and practical benefits of areca palm leaf plates. Overcoming this knowledge gap and educating the market about the advantages of switching from plastic or paper products to areca palm alternatives requires substantial time, effort, and investment. Plastic and paper plates are widely used, inexpensive, and entrenched in the market. Convincing consumers and businesses to switch to eco-friendly alternatives, especially when they may perceive traditional products as more convenient or cost-effective, can be a significant hurdle. Agrileaf faces competition from both low-cost plastic products and other biodegradable alternatives.

Areca palm leaves are sourced from specific regions, and the availability of high-quality, sustainably harvested leaves is critical for the production of finished products. Variability in supply due to weather conditions, agricultural factors, or regional harvesting challenges can impact the consistency and reliability of supply.

As demand for eco-friendly products grows, scaling production to meet this demand while maintaining quality can be challenging. Agrileaf must balance the need to increase production capacity with ensuring sustainable sourcing and maintaining the environmental standards that define its products. While areca palm leaf plates are durable and suitable for many applications, some consumers may still be sceptical about their durability, especially when compared to plastic alternatives. Ensuring the product meets consumer expectations in terms of strength and usability is critical for wider adoption. As a relatively niche player in the sustainable product market, Agrileaf may struggle with brand recognition in a crowded market. Competing for consumer attention alongside well-established eco-friendly brands and large companies that produce plastic alternatives is a significant challenge.

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Why B2B TECH REVOLUTION is Imperative for Indian Agriculture

DHANASHREE MANDHANI, Founder and CEO, Salam Kisan

The agritech ecosystem offers a groundbreaking chance to boost agricultural efficiency by 25-35 per cent, alongside adding $95 billion to the economy. Firms that prioritise technology integration today will enhance their ability to gain market share in the fast-expanding agritech industry. Agribusinesses that adopt these technologies now will be the ones influencing the future of agriculture in the days to come.

Technology is rapidly becoming the cornerstone of agricultural transformation, poised to create a $62.76 billion opportunity for agribusinesses by 2031. As global food demand surges to meet the needs of 9.8 billion people by 2050, traditional farming methods alone cannot deliver the required 70 per cent increase in production. This gap presents a crucial opportunity for agribusinesses to leverage technology solutions that can revolutionise farming operations, optimise supply chains, and create sustainable growth at scale.

Agribusinesses are bridging this gap and bringing a paradigm shift in the agriculture sector with the integration of advanced technologies to bring operational efficiency. Leading companies are deploying artificial intelligence (AI), the Internet of Things (IoT), and drone technologies to create end-to-end solutions that benefit both their operations and their farming partners.

Why Tech Integration is Key

The technological revolution has created significant strategic advantages for B2B players across the agricultural sector. Agricultural corporations and startups are developing and deploying AI-powered systems not just for farm-level decisions but to optimise their entire supply chain - from procurement to distribution. Supply chain optimisation through real-time tracking and analytics has enabled agribusinesses to manage inventory more efficiently and reduce wastage substantially. Supply chain technology has also emerged as a critical investment area, with solutions focusing on traceability, quality management, and logistics optimisation.

Another innovation that is empowering farmers and agribusinesses is precision agritech. They are revolutionising how agribusinesses optimise their operations and support their farming partners. By integrating GPS guidance systems, advanced sensors, and drone technologies, companies can now offer data-driven solutions that transform traditional farming practices. These enterprise-grade systems provide real-time analytics and actionable insights, enabling agribusinesses to help farmers reduce input costs while increasing yields. For instance, leading agricultural corporations are using sensor networks and drone fleets to create detailed field maps, monitor crop health, and implement variable-rate application of inputs – delivering both environmental sustainability and improved profit margins across their supply chain.

Furthermore, IoT-enabled solutions have revolutionised resource allocation across business networks, while advanced sensing technologies have dramatically improved quality assessment and standardisation processes.

Transformative Success Stories

Successful technology integration in agriculture increasingly relies on strategic partnerships. India has made substantial investments in sustainable agricultural intensification (SAI) to tackle food security and sustainability challenges. The government, alongside private investors, allocates over $3 billion annually to agricultural innovation. These investments have resulted in the development of innovative solutions that strengthen market linkages, enhance crop resilience, and promote sustainable farming practices.

The impact of technology integration in agriculture is best illustrated through real-world success stories. For instance, the "Saagu Baagu" project, part of the Artificial Intelligence for

Agriculture Innovation (AI4AI) initiative, has greatly boosted yields and incomes for 7,000 chilli farmers in Telangana. Developed in collaboration with the Telangana government, with support from the Bill and Melinda Gates Foundation and implemented by Digital Green, the project has leveraged agritech and data management to double farmers' earnings.

Similarly, tech-agribusiness collaborations, such as Microsoft's partnerships with agricultural corporations, such as ITC Limited, have demonstrated the transformative power of technology integration. ITC's e-Choupal network, for instance, has leveraged digital tools to provide farmers with real-time information on market prices, weather conditions, and best agricultural practices. Farmers using this can improve their day-to-day farming operations.

Research institutions are also partnering with private companies to develop market-ready solutions. Government-private sector initiatives like the Digital Agriculture Mission are creating enabling environments for technology adoption. These collaborations have proven that technology integration can simultaneously serve business interests and agricultural development goals.

Addressing Market Challenges

While agritech promises significant benefits, its widespread adoption in India faces several complex challenges that present unique opportunities. Understanding these barriers and developing strategic responses has become crucial for agribusinesses looking to expand their market presence.

The high cost of technology implementation remains a primary concern, particularly for small and medium-scale farmers, who constitute 85 per cent of India's farming community. Forward-thinking agribusinesses are addressing this through innovative financial models. Agritech companies have introduced equipment-as-a-service platforms, allowing farmers to access expensive machinery and advanced technologies through affordable subscription plans. Other businesses have implemented pay-per-use models for drone services and soil testing equipment, significantly lowering the entry barrier for modern farming technologies.

Digital literacy presents another significant challenge, particularly in rural areas. Progressive agribusinesses are tackling this through comprehensive support systems. For instance, Cropin has developed intuitive, multilingual interfaces for their farm management solutions, complemented by extensive training programmes. Companies are also deploying local digital ambassadors who provide hands-on training and troubleshooting support, ensuring that farmers can effectively utilise these technological solutions. These initiatives not only address the immediate challenge of digital adoption but also help businesses build lasting relationships with their farming partners.

Infrastructure limitations, particularly poor internet connectivity in rural areas, have traditionally hindered technology adoption. However, innovative agricultural technology providers are now developing offline-first applications that can function with minimal connectivity. For example, smart IoT devices can collect and store data locally, syncing with central servers when connectivity is available. Some companies are also investing in edge computing solutions, processing data closer to the source and reducing dependence on constant internet connectivity.

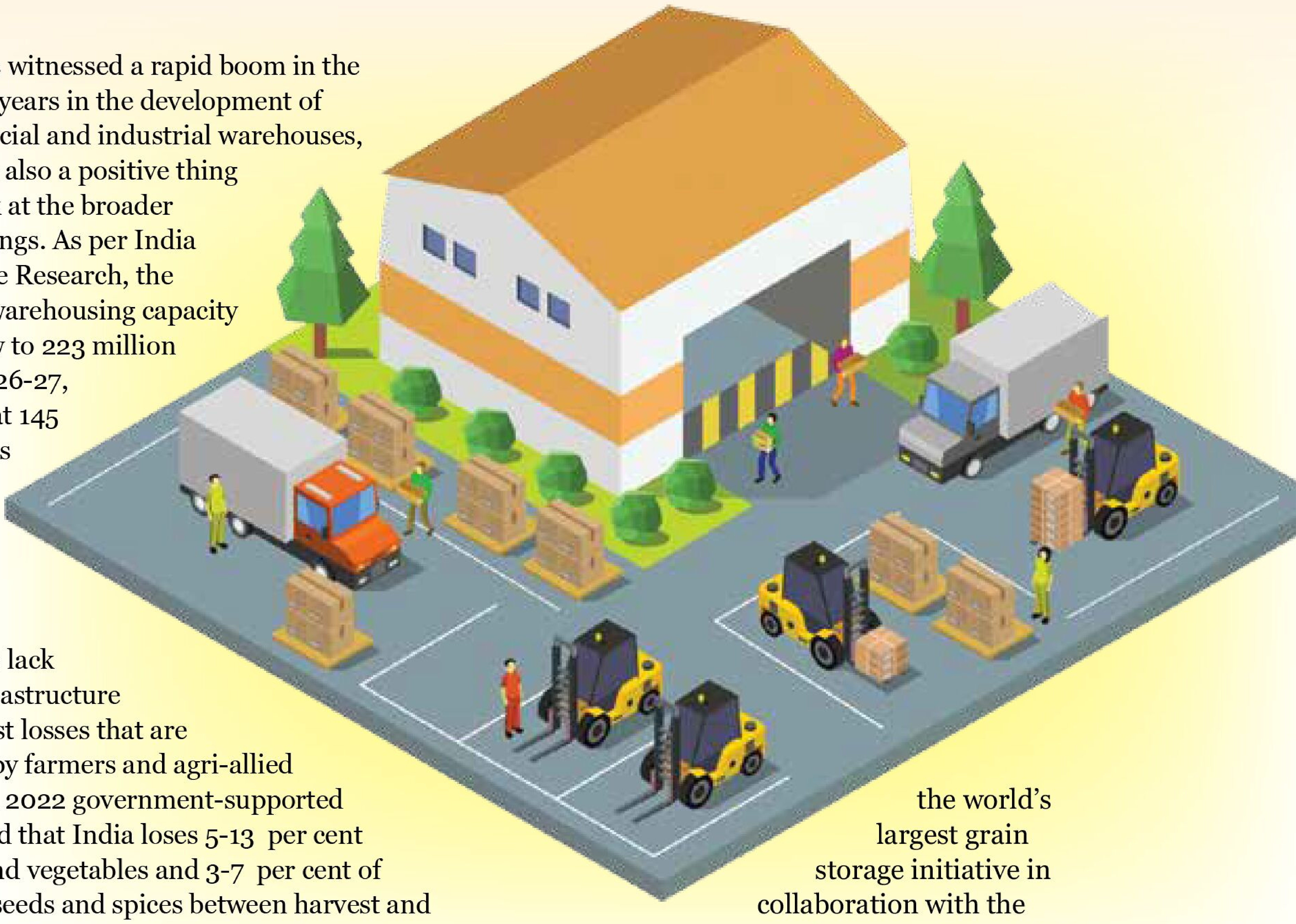
Language barriers and regional variations in farming practices require localised solutions. Progressive agribusinesses are investing in developing region-specific technology packages that account for local languages, farming practices, and crop patterns. These customised solutions have proven more effective in driving technology adoption while helping businesses build a stronger regional presence.

Moreover, the shortage of skilled personnel to operate and maintain advanced agricultural technologies has led to the emergence of specialised training initiatives. Agribusinesses are partnering with agricultural universities and technical institutions to develop certification programmes for drone operators, IoT technicians, and other specialised roles. Such programmes not only address the skill gap but also create employment opportunities in rural areas. By actively addressing these challenges through innovative solutions, agribusinesses are not only expanding their market reach but also contributing to the overall modernisation of Indian agriculture. The success of these initiatives demonstrates that barriers to technology adoption can be transformed into opportunities for business growth and agricultural development.

Agri Warehousing Industry Targets Operational Efficiency and Rural Empowerment

SANDEEP SABHARWAL,
Group CEO, Sohan Lal Commodity Management Limited

The agricultural sector in India has long been the backbone of the economy, employing millions and ensuring food security for a growing population. Inevitably, it has various critical components within the sector, like energy, transportation, and water that get the most attention, which is somewhat deserved also. However, there is another crucial part of the whole supply chain that often gets overlooked, which is Post-harvest Agri Logistics Management, playing a crucial role in the mitigation of food grain losses, stabilising market supply, and providing financial linkages to farmers.



India has witnessed a rapid boom in the last few years in the development of commercial and industrial warehouses, which is also a positive thing when we look at the broader scheme of things. As per India Infrastructure Research, the agricultural warehousing capacity needs to grow to 223 million tonnes by 2026-27, which stood at 145 million tonnes in June 2023. Another major concern seeded by the lack of proper infrastructure is post-harvest losses that are experienced by farmers and agri-allied businesses. A 2022 government-supported study revealed that India loses 5-13 per cent of its fruits and vegetables and 3-7 per cent of crops like oilseeds and spices between harvest and consumption. This results in an annual economic loss exceeding Rs 1.52 trillion. Key factors contributing to these losses include inadequate storage facilities, inefficient handling, and adverse weather conditions.

In recent years, there has been a significant shift in focus toward improving agricultural warehousing in India. A major milestone came in March 2024, when PM Narendra Modi unveiled the world's largest grain storage initiative in collaboration with the cooperative sector. This ambitious programme aims to create storage facilities for 70 million metric tonnes of grain over the next five years, supported by a massive investment of Rs 1.25 trillion from the government. The initiative will address critical infrastructural needs, such as the construction of modern godowns. This brings hope for a better future and many trends could emerge or gain strong momentum in 2025.

Digital Transformation

Technology is at the forefront of the agri-warehousing revolution, enabling greater efficiency, transparency, and scalability.

Smart Warehousing: IoT devices and AI-driven analytics are now standard in contemporary warehouses. Sensors monitor storage conditions in real-time, ensuring commodities remain in optimal conditions. Predictive analytics helps warehouse managers forecast demand, reducing overstocking or underutilisation of space.

ERP's for Supply Chain Transparency: Technology has introduced unparalleled transparency and trust into the supply chain. ERP that has been customised to mimic SoPs of physical requirements of handling grains is being used to track food grain movement, ensuring transparency, traceability, and fraud prevention in the warehousing ecosystem.

Expansion of Storage Infrastructure

Government Initiatives: Programmes like India's grain storage initiative aim to expand storage capacity significantly. By 2025, rural areas are expected to see a surge in the construction of modern godowns and silos.

Cold Storage: Growth in the demand for cold storage facilities for perishable produce like fruits, vegetables, and dairy is transforming agri warehousing. Integrated cold chain networks, connecting cold storage with processing units and retail markets, are gaining prominence.

Climate-resilient Infrastructure

Warehouses are increasingly adopting climate-resilient designs to withstand extreme weather conditions, such as floods or heatwaves, ensuring the safe storage of grains.

Customised Solutions for diverse commodities

Warehousing companies are developing specialised storage systems for perishable items like fruits and vegetables and bulk storage for grains and pulses. This customisation enhances the quality and shelf-life of stored commodities.

Focus on Sustainability and ESG

Solar-powered warehouses and energy-efficient technologies are gaining traction to reduce operational costs and environmental impact.

Sustainable waste management practices like paperless workflows by digitising warehousing operations reduce deforestation-related impacts. Adoption of ERP ensures efficient monitoring and reporting, reducing energy and resource wastage.

Integration with Agri-finance

Warehouse Receipt Financing: Farmers are using warehouse receipts as collateral to secure loans, enabling them to store produce longer and sell at favourable prices. The digitisation of warehouse receipts is a game-changer in the agri-finance and agri-warehousing sectors, enhancing transparency, efficiency, and accessibility. By converting traditional paper-based receipts into digital formats, farmers and stakeholders in the supply chain can access, transfer, and utilise warehouse receipts instantly, making the process more streamlined and efficient.

Global Adoption of Phygital Innovations

Developing countries like Cambodia, and Vietnam may come forward to implement our Phygital Innovations in agri-logistics with support from our governments and private players, creating smart supply chains that connect farms to end-consumers seamlessly.

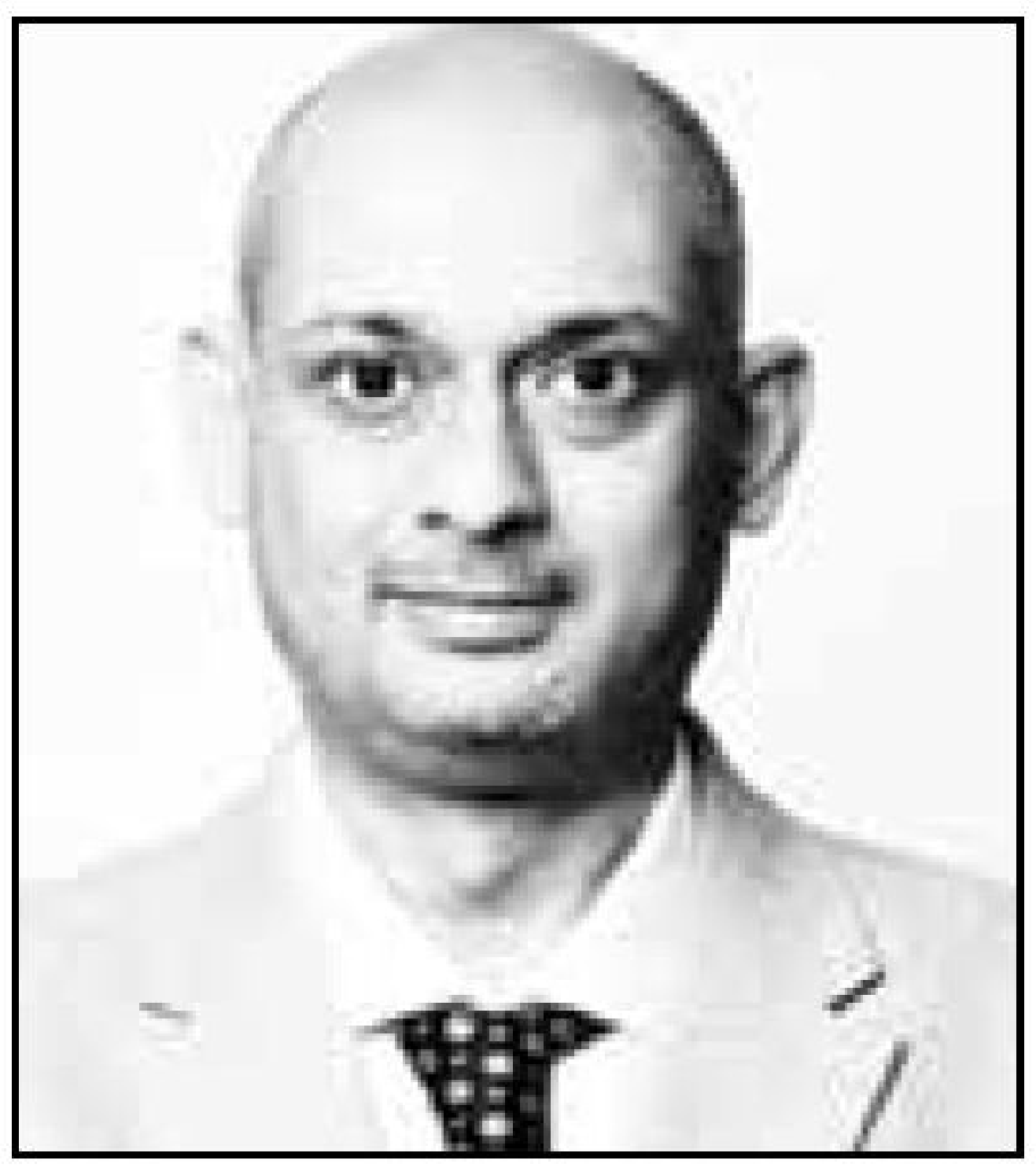
Future Outlook

As the agri-warehousing industry in India continues to evolve, it must address immediate challenges while preparing for long-term sustainability. The trends in 2025 indicate that technology, financial integration, sustainability, and collaboration will remain the cornerstones of this transformation.

For stakeholders—be they farmers, traders, or investors—the ability to adapt to these trends will be crucial. By leveraging emerging technologies, forming strategic partnerships, and aligning with regulatory frameworks, the industry can achieve its twin goals of operational efficiency and rural empowerment.

2025 offers a promising horizon where warehousing does not merely serve as a storage solution but merges as a pivotal force in shaping the agricultural economy.

Samunnati names Badri Narayanan, a former Unilever veteran as Group CEO Designate



Samunnati, India's pioneering agri-value chain enabler, has announced a strategic leadership realignment to deepen its focus on empowering smallholder farmers and driving transformative growth in the agri-ecosystem. In this significant move, Badri Narayanan, a former Unilever veteran, has been appointed as the Group CEO Designate, and Anil Kumar SG, Founder & Group CEO, will be elevated to the position of Founder & Managing Director. Badri will focus on operational excellence, ensuring seamless execution of Samunnati's vision and mission. Over the next 6–8 months, upon the completion of the integration processes, Badri will transition to the role of Group CEO, leading Samunnati's operations and driving impactful initiatives. With more than 24 years of experience at Unilever, Badri brings a wealth of expertise in general management, sales, marketing, digital commerce, and operations. He has a proven track record of driving success in emerging markets and leading global initiatives.

Uday Singh of Namdhari Group receives "Honorary Lifetime Members" award at Asian Seed Congress 2024

Uday Singh, Chairperson of the Namdhari Group, was recently conferred with the prestigious "Honorary Lifetime Members" award at the Asian Seed Congress 2024. This recognition honours his unparalleled contributions to the seed industry and agricultural innovation across India and the Asia-Pacific region. Over the years, Uday Singh has been a driving force behind transformative initiatives that have shaped the global agricultural landscape. He was instrumental in bringing the International Seed Federation (ISF) Congress to India and played a pivotal role in establishing the Federation of Seed Industry of India, fostering collaboration and innovation within the sector. A recipient of multiple awards from APEDA for excellence in agriculture and exports, Uday Singh's leadership continues to inspire a generation of agricultural pioneers.

ICFA appoints Dr Vibha Dhawan as a Board Member

Indian Chamber of Food and Agriculture has announced the appointment of Dr Vibha Dhawan Director General of TERI – The Energy and Resources Institute as a Board Member. Dr Vibha holds a Ph.D. in Biotechnology and is a recognised leader in sustainability. She has led groundbreaking research on climate solutions, agriculture, and energy systems and has driven policies and practices that promote environmental stewardship. She played a pivotal role as Co-ordinator for the Asia Pacific Consortium on Agriculture Biotechnology (APCoAB); as Advisor to the Director General, The International Maize and Wheat Improvement Centre (CIMMYT) as well as Deputy Director, Research Partnerships & Co-ordination with the Borlaug Institute for South Asia. She has served on the boards of prestigious organisations in India and overseas including Jawahar Lal Nehru University, Ambedkar University, Ayurvet Foundation and Centre for Agriculture and Bioscience International (CABI). Dr Vibha is currently a member of the Networks Strategy Council that advises Sustainable Development Solutions Network – a global initiative for the United Nations and was previously the Co-Chair of the T20 Task Force 4 on Refuelling Growth: Clean Energy and Green Transitions.

“Our goal is to ensure the prosperity and sustainability of the farming community”

Syed Junaid Altaf, Promoter & Group Executive Director, FIL Industries Private Limited

With its commitment to bringing global excellence to India, FIL Industries Private Limited has established a diversified enterprise committed to creating an impact holistically across agriculture, food and beverage, and health sectors, among others. FIL’s portfolio spans innovative agri-input solutions, 100 per cent natural fruit concentrate, functional drinks and ready to serve beverages, packaged drinking water, post harvest management advisory and storage facilities. FIL’S expertise extends beyond cultivation with robust post-harvest management solutions designed to minimise losses, maintain quality, and optimise supply chains. Syed Junaid Altaf, Promoter & Group Executive Director, FIL Industries Private Limited shares in a conversation the inside track about the company, its ethos and future outlook.

Could you provide an overview of FIL Industries' contribution to the agribusiness sector?

FIL Industries Private Limited has cemented its position as a leading end-to-end solution provider in the agri-consumer value chain. As India’s largest apple integrator, FIL has significantly transformed and demonstrated, especially in Kashmir and other apple growing regions, on how apples are cultivated, harvested, processed, stored, packed, and consumed. Our comprehensive offerings span crop nutrition, crop protection, and stone fruit nurseries, driving sustainable agricultural practices and empowering farmers to achieve greater productivity and prosperity.

We take immense pride in serving as an enabler in bridging the gap between the farmer and the consumer. Over the last three decades, we have significantly enhanced our strategy and are now adopting an all encompassing approach while building a sustainable value chain to augment the agricultural ecosystem. We are doing this by leveraging modern technology and introducing innovative solutions customised to Indian requirements. Our foray into bio molecules, stone fruit nurseries and agro-cluster management has allowed for reinvention of the region’s value chain and transformation of fruit growing areas.

How does FIL Industries support the growth and development of local agriculture in the regions where you operate?

We constantly endeavour to support local agriculture by providing tailored hands-on agri-input solutions, and cutting-edge innovations. For instance, with our state-of-the-art stone fruit nurseries, we have revolutionised apple and stone fruit cultivation, ensuring higher-quality produce and enhanced farming practices. Moreover, through our comprehensive range of crop nutrition and protection products, we promote healthier crops, higher yields, and enriched soil fertility.

FIL’s expertise extends beyond cultivation with robust post-harvest management solutions designed to minimise losses, maintain quality, and optimise supply chains. Complemented by advisory services for the growers, we offer strategic insights and technical guidance, empowering farmers to make informed decisions and achieve sustainable growth.

Our team of experts regularly interacts with the agricultural community to address their needs comprehensively, thereby fostering development at the grassroots level and reinforcing our commitment to a thriving agricultural ecosystem.

How has FIL Industries successfully implemented new technologies to improve agricultural productivity and sustainability?

As pioneers of Controlled Atmosphere (CA) storage technology in India, we have capitalised on this to ensure that harvested produce retains its quality, flavour and nutritional value for extended periods. This also significantly reduces post-harvest losses thereby enabling farmers to access wider markets. This innovation has been a game-changer in bridging the gap between seasonal harvests and year-round availability and fostering a sustainable value chain connecting farmers to consumers.

We continue to augment agricultural productivity and sustainability through cutting-edge solutions tailored to India’s unique needs such as our collaborations with global partners, DALIVAL from France and the Kimitec Group from Spain. These partnerships have brought in advanced technologies to India, including high-quality stone fruit nurseries and bio-molecules thus revolutionising fruit cultivation across the country. Furthermore, we have also introduced interventions like IoT-based technologies, India's first parametric apple crop insurance and nutrient management solutions to promote healthier crops, enriched soil, and higher yields. I believe that such investments are the need of the hour to pave the way for a resilient and sustainable horticulture industry in India.

Would you like to share some of the most significant challenges that you face in the agribusiness sector?

Challenges in the agribusiness sector include climate variability, pest resistance, and soil degradation. FIL addresses these through research-driven products such as plant growth regulators, pest-resistant rootstocks, and tailored crop protection solutions. By employing technology and collaborating with farmers, we ensure resilience and adaptability in our operations.

How does FIL Industries collaborate with local farmers and agribusinesses to improve practices and outcomes?

We recognise that collaboration with farmers is essential to achieving long-term agricultural success. Having established a symbiotic relationship with farmers, particularly in Jammu and Kashmir, we envision that the region will enhance its apple growing capabilities. This vision is supported by initiatives such as our Apple Cluster Project in Shopian, which is India's only apple cluster project. Awarded by the National Horticultural Board, as part of the Government of India's initiative, the project spans 21,000 hectares and involves over 50,000 farmers. It is designed to leverage the geographical strengths of the region and drive integrated, market-led development across the entire apple production process, from pre-production to post-harvest and marketing.

Moreover, FIL also offers innovative solutions and services like apple insurance, the establishment of processing facilities in CA stores, as well as the broader apple cluster project, all of which are geared towards empowering the farming community. These initiatives not only assist in improving the quality of produce but also provide farmers with necessary tools required to overcome challenges, while augmenting productivity. We believe in our all-encompassing approach while building a sustainable value chain to enhance the development of the horticulture sector in Jammu and Kashmir and are hopeful of becoming a global hub for apple cultivation.

We are also working closely with farmers in the horticulture value chain in Himachal Pradesh, Maharashtra, Karnataka and Uttarakhand.

What does the future of agribusiness look like for FIL Industries in the next 5-10 years and how do you plan to scale your agribusiness practices while maintaining sustainability and profitability?

Agriculture is a long-term endeavour, and we recognise the challenges posed by climate change as well as the evolving demands of the global market.

FIL's aim is to reduce risks and enhance livelihoods at the farm level. We are committed towards shaping the future of agri business and driving greater agricultural productivity by integrating advanced technologies, promoting sustainable practices, and fostering partnerships across the industry. This will be accomplished by focusing on innovations like high-density fruit cultivation, precision farming techniques and robust crop management solutions.

Looking ahead, our goal is to lead a food revolution that not only addresses global demands but also ensures the prosperity and sustainability of the farming community. Our strategy encompasses investing in R&D to develop regenerative agri products, expanding its geographic reach, and leveraging partnerships with global leaders.

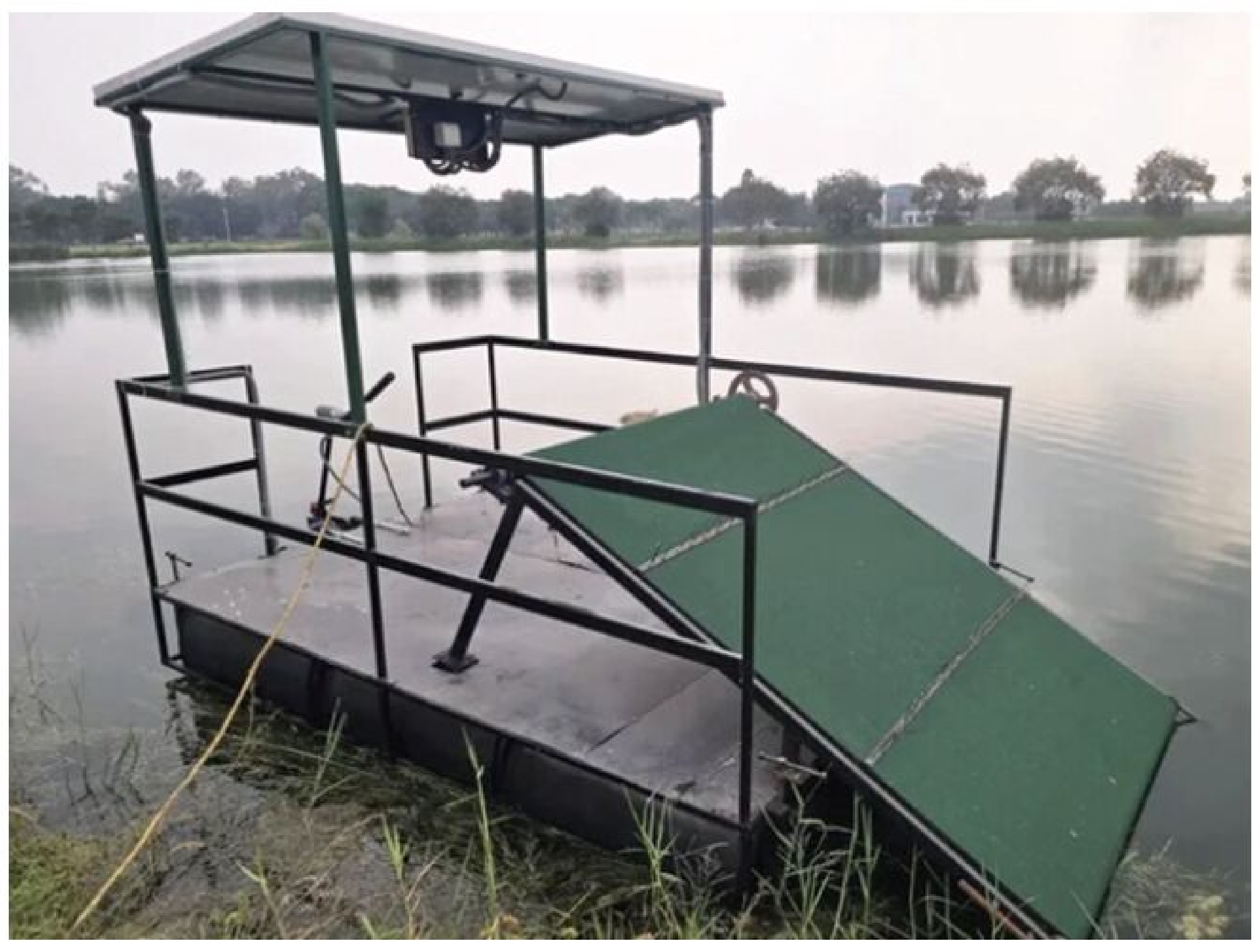
FIL strives to balance growth with environmental and economic sustainability by aligning its operations with sustainable practices, such as deploying bio-stimulants and ensuring cost-effective solutions with inter-biologicals as well as parametric crop insurance measures. I am confident that through these initiatives, FIL will lead the way in creating innovative solutions that foster long-term value for the agricultural sector, specifically the horticulture value chain and the communities it serves.

Which new markets and/or regions are you exploring?

We are exploring partnership opportunities to expand operations in the horticulture value chain including plantations and greenhouses in regions such as Tamil Nadu, Karnataka, West Bengal within India and internationally in West Africa and SouthEast Asia.

We also plan to introduce our innovative solutions to underserved areas such as the North Eastern states, ensuring broader access to our expertise in crop nutrition, protection, stone fruit nurseries and post-harvest management including food processing.

ICRISAT secures industrial design grant for its 'Solar-Powered Water Hyacinth Harvester'



ICRISAT was granted its first industrial design in India for a Solar-Powered Water Hyacinth Harvester developed by a team of scientists. The harvester is simple, affordable, and can be efficiently managed by semi-skilled or unskilled personnel. The solar-powered equipment, designed and fabricated in-house, is an affordable solution priced at under Rs 200,000, making it ideal for rural farming communities that cannot afford sophisticated machinery costing 10 times as much. It offers substantial benefits, including 50–60 per cent savings in cost, time, and labour, while prioritising using clean energy. Water hyacinth infestations in rural ponds disrupt ecosystems, harm fisheries, and block canals. Their rapid growth and long-lasting seeds make eradication difficult. Just 8–10 plants can proliferate into over 600,000 plants within 6–8 months.

George Kurian inaugurates Centre of Excellence for Seaweeds at CMFRI, Kochi

George Kurian, Union Minister of State for Fisheries, Animal Husbandry & Dairying, inaugurated the Centre of Excellence (CoE) for Seaweeds at the Mandapam Regional Centre of ICAR-Central Marine Fisheries Research Institute (CMFRI), Kochi. The Government of India recently designated ICAR-CMFRI Mandapam as the Centre of Excellence for the holistic development and promotion of seaweed culture in the country. The CoE will significantly boost seaweed cultivation in India. The minister also inaugurated the Seaweed Plantlet Production Unit at the Mandapam Centre under the CoE. The Mandapam Regional Centre has set up many facilities including Marine Hatchery Complex, National Marine Fish Brood Bank, Recirculatory Aquaculture System (RAS), Sea Cage Farm, Green Tiger Shrimp Hatchery (established under the PMMSY scheme), Marine Biodiversity Museum, and Marine Aquarium.

Dr Himanshu Pathak inaugurates WoAH Reference Laboratory at NIVEDI

Dr Himanshu Pathak, Secretary Department of Agricultural Research and Education (DARE) and Director General, Indian Council of Agricultural Research (ICAR), inaugurated the prestigious World Organization for Animal Health (WOAH) Reference Laboratory for Leptospirosis at ICAR-National Institute of Veterinary Epidemiology and Disease Informatics (NIVEDI). Leptospirosis, a major zoonotic disease caused by Leptospira bacteria, poses a significant public health challenge, especially in high-prevalence areas. The newly inaugurated laboratory at NIVEDI's advanced biosafety laboratory marks a key step in addressing this re-emerging disease. Equipped with state-of-the-art diagnostic tools, the facility supports research, development, and capacity-building programmes, strengthening India's efforts in the global fight against Leptospirosis.

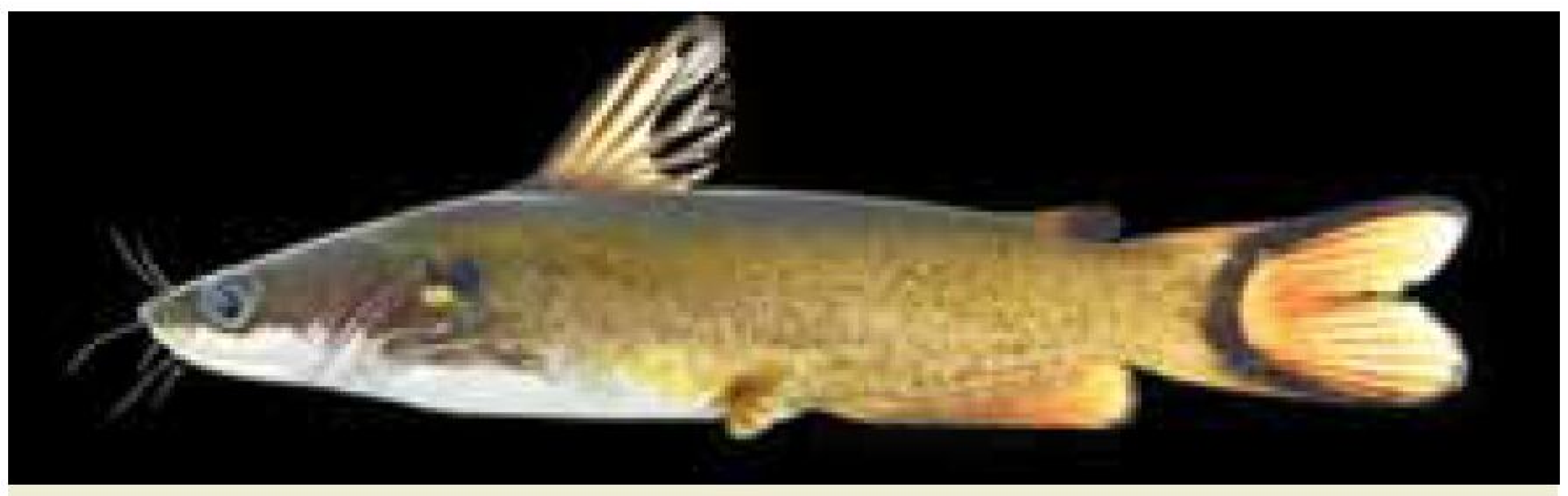
CMFRI transfers insect protein-based fish feed technology to Bhairav Renderers

In a significant step towards fostering sustainable aquaculture, the ICAR-Central Marine Fisheries Research Institute (CMFRI) signed a Memorandum of Understanding (MoU) with Bhairav Renderers, Coimbatore, Tamil Nadu, to transfer its technology for producing fish feed using Black Soldier Fly Larvae (BSFL). The collaboration seeks to equip Indian fish farmers with the tools necessary to boost productivity while minimising the ecological impact of their operations. The linkage with ICAR-CMFRI will help fish farmers to get a sustainable and affordable alternative that will not only benefit their bottom line but also contribute to the overall health of our ecosystem. Bhairav Renderers will begin producing insect protein feed at an industrial scale, initially targeting the Tamil Nadu market and gradually expanding its reach. Overfishing and environmental concerns surrounding the use of fishmeal have raised alarms about the long-term sustainability of traditional aquaculture feed practices. In response to these challenges, ICAR-CMFRI's technology harnesses the power of BSFL, which is rich in protein, essential amino acids, and fats, making it an excellent source of nutrition for farmed fish.

CIRCOT inks 4 MoUs to revolutionise cotton storage and agricultural practices

The ICAR-Central Institute for Research on Cotton Technology (ICAR-CIRCOT) has signed a series of impactful agreements with leading industry players to bring innovative technologies to the cotton and agriculture sectors. The institute entered into four Memoranda of Understanding (MoUs) with major industry partners, including Farmtek Solutions, Nashik; Micro Sales India, Nashik; United Cotton Extract Pvt. Ltd., Malegaon; and Prakash Agro Plast, Nashik. These collaborations focus on the commercialisation of the "Seed Cotton Collection & Storage Bag with Anti-microbial Finish" technology. This innovative solution aims to significantly reduce contamination and trash content in cotton during the collection and storage processes.

MOU
Memorandum Of Understanding



NBFGR discovers new sympatric yellow catfish species

Researchers from the ICAR-National Bureau of Fish Genetic Resources (NBFGR) have identified a new yellow catfish species, Horabagrus Obscurus, in Kerala's Chalakudy river. Characterised by its greenish-brown mottled coloration, shorter barbels, and distinct genetic traits, the species coexists with the endangered Horabagrus Nigricollaris. This discovery, led by ICAR-NBFGR's Centre for Peninsular Aquatic Genetics Resources and published in the Indian Journal of Fisheries, highlights the rich biodiversity of the Western Ghats. Dr U.K. Sarkar, Director, ICAR-NBFGR, described the discovery as a significant achievement in protecting India's aquatic resources. He highlighted the importance of conserving Horabagrus Obscurus through initiatives like captive breeding and habitat restoration, calling it a vital step towards preserving the delicate ecosystems of the Western Ghats.

Coromandel partners with Mahindra Krish-e to extend its drone spraying services

Coromandel International Limited, India's leading agri-solutions provider, and Mahindra & Mahindra Limited's Farm Equipment Sector (FES) business vertical, Krish-e, announced a partnership to extend Coromandel's drone spraying services, Gromor Drive, to Indian farmers. Currently operational in seven key states Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Maharashtra, Madhya Pradesh and Uttar Pradesh, Gromor Drive's operations are supported by RPTO-trained pilots. Coromandel's drone services are uniquely positioned in the market through the support of its subsidiary, Dhaksha Unmanned Systems, which ensures reliable drone supply, pilot training, and service support. This backward integration provides Coromandel with a distinct competitive edge in this emerging market. The partnership further enhances accessibility to these services via the 'Krish-e Kheti Ke Liye App,' along with other technology-driven farm solutions offered by Mahindra's FES, aimed at sustainably maximising farmers' income and benefiting the broader agricultural value chain.

Crystal Crop Protection acquires Ethoxysulfuron assets from Bayer AG

Crystal Crop Protection Limited announced the global acquisition of the active ingredient Ethoxysulfuron from Bayer AG for sales in certain Asian countries. This acquisition marks Crystal's 13th strategic transaction and second acquisition from Bayer after the acquisition of Indian Cotton, Pearl Millet and Mustard seed portfolio in 2021. Backed by International Finance Corporation (IFC), Crystal Crop is an R&D-based crop solution company delivering advanced, farmer-centric solutions for over four decades. This is amongst the largest acquisitions of Crystal, which shall boost its EBITDA by 20 per cent while bolstering its leadership in the rice herbicide market. The transaction brings the trusted Sunrice trademark and the mixture product containing Ethoxysulfuron, along with all registrations. Ethoxysulfuron is known for effectively controlling broad-leaved weeds and sedges in rice and cereal crops, making it a key addition to Crystal's portfolio. The acquisition aligns with Crystal's mission of providing cost-effective, sustainable solutions by manufacturing the product locally, resulting in enhanced cost synergies and accessibility for farmers in India, South Asia, and South-East Asia (including Vietnam, Bangladesh, Thailand, and Pakistan).

Mahindra's FES records sale of 22,019 tractors in domestic market during December 2024

Mahindra & Mahindra Ltd's Farm Equipment Sector (FES), part of the Mahindra Group, announced its tractor sales numbers for December 2024. Domestic sales in December 2024 were at 22,019 units, as against 18,028 units during December 2023. Total tractor sales (Domestic + Exports) during December 2024 were at 22,943 units, as against 19,138 units for the same period last year. Exports for the month stood at 924 units. The company mentioned that it has sold 22,019 tractors in the domestic market during December 2024, a growth of 22 per cent over last year. Sentiments have remained positive in December on account of positive cash flow momentum from the Kharif harvest. Additionally, favourable reservoir levels have resulted in strong sowing for the rabi season, further bolstering demand for tractors. Looking ahead, the tractor industry is poised for significant growth, underpinned by positive agricultural sentiments and favourable terms of trade for farmers.

HIL (India) partners with Meghmani Crop Nutrition to market Nano Urea

HIL (India) Ltd signed an MoU with Meghmani Crop Nutrition Ltd (MCNL) to market Nano Urea under the brand "HIL NANO UREA PLUS". The objective of the MoU is to fulfil the gap of Nitrogen in the soil and reduce the subsidy burden in the country. This strategic collaboration aims to empower farmers with innovative and eco-friendly farming solutions, reinforcing Meghmani's commitment to sustainable agricultural practices. The initiative aligns with the government's PM-PRANAM vision, focusing on reducing dependency on chemical fertilisers and promoting environmentally responsible farming methods. Nano urea is a liquid fertiliser that is environmentally safe and can help enhance crop productivity and nutritional quality. MCNL entered into a licensing agreement in December 2022 that allows them to produce Nano Urea (Liquid) Fertilizer using their domestically developed patented technology. HIL (India) Ltd is a Government of India Enterprise under the Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers.

PARTNER
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Agrochemicals sector to see 7-9% growth amid modest exports: CRISIL

The agrochemical sector is expected to develop at a faster rate in the upcoming fiscal year due to solid domestic demand and a rebound in export volumes. The agrochemicals industry is expected to grow at a rate of 7-9 per cent in the upcoming fiscal year, following a modest 5-6 per cent rise in the current one. A return to double-digit growth prior to the Covid-19 era will be impeded by historically low realisations, despite the fact that this will be supported by stable domestic demand and a recovery in export volumes, according to CRISIL Ratings. Additionally, operating margins are showing signs of a sluggish recovery, increasing by roughly 100 basis points to 12–13 per cent, which is still less than the 15–16 per cent pre-pandemic levels. As a result, businesses will continue to exercise caution when making capital expenditures and concentrate on working capital management to maintain stable cash flows and balance sheets.

Super Crop Safe launches Super Gold WP+ bio-fertiliser for sustainable farming

Ahmedabad based agrochemical and biotechnology company, Super Crop Safe Ltd announced the launch of Super Gold WP+, a revolutionary bio-fertiliser intended to significantly cut down on chemical fertilisers like urea and DAP while enhancing crop yields. The company's innovative offering, developed in its advanced Bio-Technology division, builds upon the successful Super Gold line and features an inoculant mycorrhiza blend that promotes better root growth and nutrient absorption. The company plans to roll out its full range of bio-fertiliser products, including Super Gold WP+, across key states such as Gujarat, Rajasthan, Punjab, Haryana, Uttar Pradesh, Uttarakhand, Madhya Pradesh, Chhattisgarh, Maharashtra, Karnataka, and Kerala. Field trials have already shown promising results, and discussions are underway with potential distributors to expand market reach. This product launch positions Super Crop Safe Ltd to capture additional market share and drive growth in the high-value, high-margin bio-fertiliser segment.

ICAR DG inaugurates Drone tech lab and Horticulture lab in Puttur

Dr Himanshu Pathak, Secretary, Department of Agricultural Research and Education (DARE) and Director General, Indian Council of Agricultural Research (ICAR), inaugurated the Drone Technology Lab and Horticulture Lab of ICAR-Directorate of Cashew Research in Puttur. These two labs were established with funding from RKVY-RAFTAAR, the Government of Karnataka, and the Department of Agriculture and Farmers' Welfare, Government of India. The state-of-the-art Drone Lab fosters innovation in UAV applications for plantation crops, promoting research and sustainable practices. Equipped with advanced drones and equipment such as HPLC, GCMS, and UV-visible spectrophotometers, the Centre of Excellence for Profiling and Bioactive Components focuses on exploring phytochemicals in cashew apples, nuts, kernels, shells, and leaves and data tools and supports smart farming solutions. Dr Pathak stressed the need for impactful research to increase the production and productivity of cashews to reduce the dependency on the import of raw cashew nuts.

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BAL secures patent for novel formulation for pest management in cotton, chilli, tea

Best Agrolife Ltd (BAL), one of India's leading agrochemical manufacturers, has been granted a synergistic patent for its novel ternary pesticide formulation that integrates Spiromesifen, Hexythiazox, and Abamectin. This breakthrough product is specifically designed to address mite infestations in cotton, chilli and tea plantations, a persistent issue that threatens crop productivity and quality. This unique formulation is effective against multiple pests, delivering unparalleled efficacy in combating various mites, as well as sucking pests like whiteflies. These pests are among the most destructive to crops and vegetables including brinjal, okra, and tomato. Initial estimates suggest a market size of Rs 200-300 crore for targeted pest management products in high value crops, offering a sustained growth opportunity for Best Agrolife Ltd. Initial sale estimates in the first year of introduction are estimated to be around Rs 15-30 crore.

DMAPR receives patent for Novel Kalmegh-based drug formulation

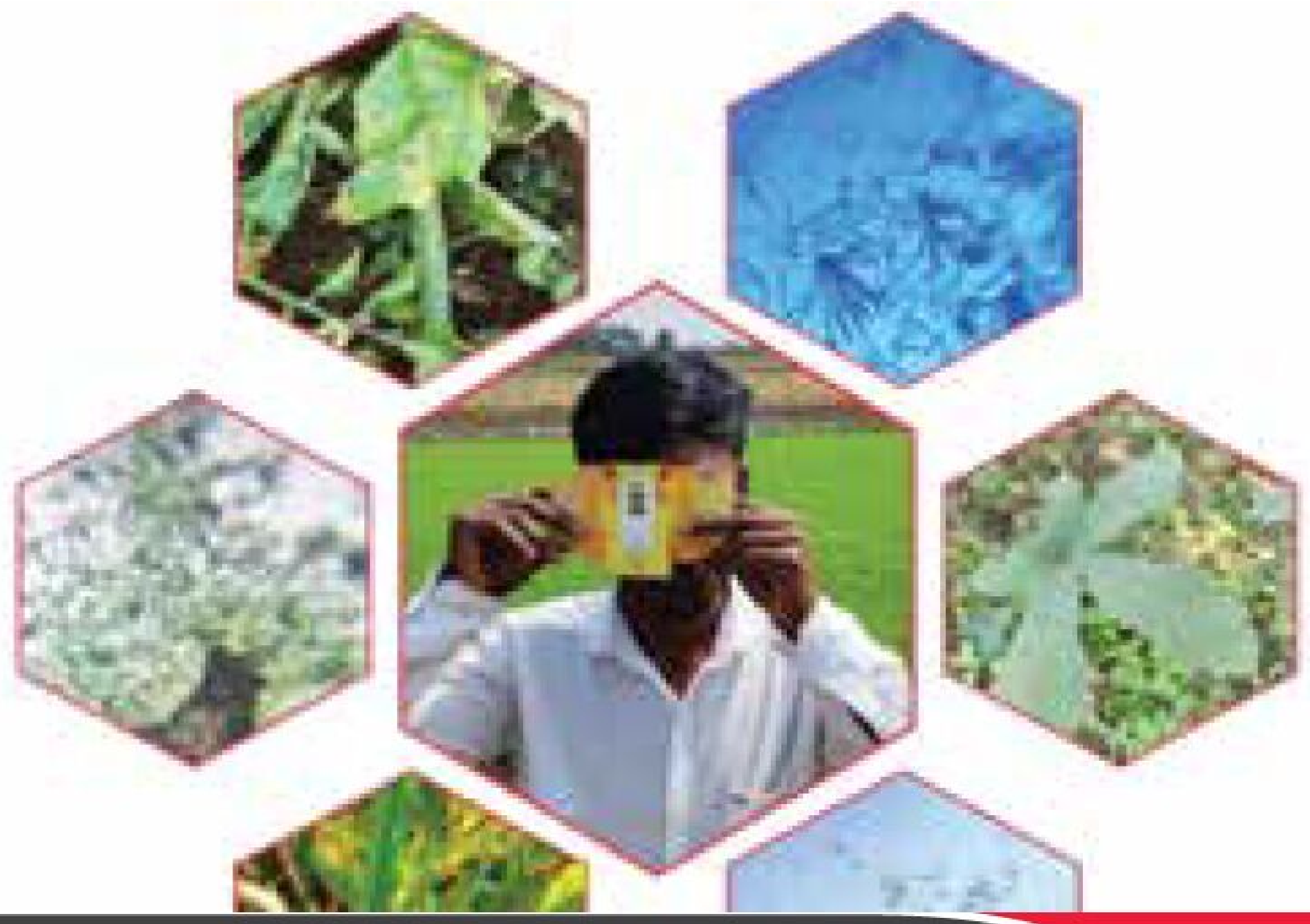
ICAR-Directorate of Medicinal and Aromatic Plants Research (DMAPR) has been granted an Indian Patent for the development of a novel drug formulation using Kalmegh (Andrographis paniculata). The patented formulation, entitled 'Development of microencapsulated formulation based on Andrographolide and Method of Preparation,' improves the bioavailability and sustained release of Andrographolide, the active compound in Kalmegh, for enhanced therapeutic efficacy. The technology was developed by Dr Narendra A. Gajbhiye and Jitendra Kumar of ICAR-DMAPR. Kalmegh [Andrographis paniculata (Burm.f.) Wall. Ex Nees] is an important medicinal plant used in Ayurveda. Kalmegh is a branched annual herb of the family Acanthaceae and is about 30-100 cm tall. Andrographolide is the active principle having the therapeutic action. The herb is used for treating diabetics, bronchitis, piles, jaundice, and fever.

CPAGR Kochi achieves breakthrough in captive breeding of black-collared yellow catfish

Researchers at the Centre for Peninsular Aquatic Genetic Resources (CPAGR), Kochi, under the ICAR-National Bureau of Fish Genetic Resources (NBFGR), Lucknow, achieved a breakthrough in aquatic conservation by developing the first-ever captive breeding protocol for the endangered, black-collared yellow catfish (Horabagrus nigricollaris). Published in Aquaculture International, this study represents the first comprehensive research on the species since its discovery in the Chalakudy River, Kerala, in 1994. The achievement underscores the importance of ex-situ conservation and offers opportunities for sustainable aquaculture, ensuring the survival of H. nigricollaris and other freshwater species of the Western Ghats. Dr U. K. Sarkar, Director, ICAR-NBFGR mentioned that beginning in 2020, the team successfully bred the first-generation stock, a crucial step in conserving this endangered species listed on the IUCN Red List. The black-collared yellow catfish is important both ecologically and in ornamental trade, but it faces habitat loss and overfishing threats.

Foldscope Microscopy empowering farmers in Chhattisgarh to detect plant diseases

Farmers across 20 districts of Chhattisgarh received a Foldscope, a portable and affordable microscope, a new tool that is empowering communities in the state to take agricultural decisions with the help of frugal science and hence helping agricultural livelihoods. It is helping in in-situ diagnosis and digital cataloging of plant-pathogenic fungi through Foldscope Microscopy. The initiative spread across the districts of Raigarh, Janjgir-Champa, Balodabazar-Bhatapara, Raipur, Dhamtari, Durg, Rajnandgaon, Mohla-Manpur-Ambagarh Chowki, Koriya, Surguja, Jashpur, Korba, Sakti, Mahasamund, Bilaspur, Mungeli, Kabirdham, Bemetara, Kanker, and Bastar spanning over 30 villages is being implemented by ICAR – National Institute of Biotic Stress Management. It is supported under the SYST programme of the SEED Division of the Department of Science and Technology (DST).



Russian scientists develop citrus-based alternative to agricultural pesticides

Scientists at the Southern Federal University (SFedU) in Russia have developed an eco-friendly alternative to toxic pesticides using citron juice, a breakthrough that could help prevent the 14 per cent global crop loss caused by post-harvest pathogens. The innovative method produces silver nanoparticles with potent antibacterial properties, offering a sustainable solution to one of agriculture's most pressing challenges. The research, published in Discover Nano journal, demonstrates a significant advancement in sustainable agricultural technology. The international team, including collaborators from China, India, and Poland, developed the method under Russia's Priority 2030 national research initiative. This technology could revolutionise how we protect our harvests. Our green-synthesized silver nanoparticles have shown remarkable antimicrobial activity against several phytopathogenic molds that typically devastate post-harvest crops, mentioned Dr Sudhir Shende, lead researcher at SFedU.

BLR Airport reports its highest-ever annual cargo tonnage of 496,227 MT in 2024

Kempegowda International Airport Bengaluru (BLR Airport) has reported its highest-ever annual cargo tonnage of 496,227 metric tonnes (MT) in 2024, registering 17 per cent increase in international and domestic segments compared to 2023. International cargo saw a 23 per cent growth, totalling 313,981 MT, driven by increased demand for perishables, spare parts, engineering goods, and e-commerce shipments, while domestic cargo volumes increased by 9 per cent, reaching 1,82,246 MT, spurred by seasonal perishable volumes and expanding e-commerce activity, mentioned BLR Airport. BLR Airport retains its pole position as the country's number one airport for perishable exports for the fourth consecutive year. Processed 63,188 MT in FY 2023-24, an 18 per cent growth over PY, handling 28 per cent of the country's and 44 per cent of South India's total perishable air cargo, according to the release. BLR Airport processed over 10.8 million rose stems, totalling 411 MT, a growth of 14 per cent to previous year. Similarly, mango exports saw a 20 per cent increase to 822 MT and coriander domestic movement was at 5200 MT with a 53 per cent growth rate.

JNPA issues LoA to Trident Agrocom Exports & Man Infraconstruction for agri processing facility

Jawaharlal Nehru Port Authority (JNPA) said that it has issued a Letter of Award (LoA) to Trident Agrocom Exports and Man Infraconstruction consortium for the development of an export-import cum domestic agriculture commodity-based processing and storage facility at its port. Once operational, the export-import-cum-domestic agricultural commodity-based processing and storage facility coming up on a 27-acre land parcel within the port complex, is expected to handle about 1.2 million tonnes of cargo annually. The facility will significantly contribute to the country's agro trade by improving the processing, storage capabilities, and transportation infrastructure for agricultural commodities. This project will enhance India's agricultural logistics capabilities and support the growth of both domestic and international agro trade. This is India's first one-of-its-kind facility provided by JN Port which is designed to provide comprehensive services including processing, sorting, packing, and laboratory facilities, emphasizing its commitment to ensuring compliance with food safety and trade regulations. It shall cater to the agricultural commodities not only of Maharashtra but also of other states such as Madhya Pradesh and Gujarat.

APSEZ enters Top 10 list in 2024 S&P Global CSA Rankings

Adani Ports and Special Economic Zone Ltd (APSEZ) was ranked among the Top 10 global transportation and transportation infrastructure companies in the 2024 S&P Global Corporate Sustainability Assessment (CSA), with a score of 68 (out of 100)—three points improvement over last year. APSEZ is now placed in the 97th percentile within the sector, improving from the 96th percentile in 2023. For the second consecutive year, APSEZ secured the number one spot in the Environment dimension. It also achieved the highest scores across several criteria in the Social, Governance & Economic dimensions, including Transparency & Reporting, Materiality, Supply Chain Management, Information Security/Cybersecurity & System Availability, and Customer Relations.

AgroSpectrum
TECHNOVATE
Transforming Agriculture with Innovation & Tech
2025
12th - 13th, March 2025
CIDCO Convention Centre, Mumbai

AgroSpectrum Technovate 2025: Shaping the Future of Agritech Through Innovation and Emerging Technologies

AgroSpectrum is proud to announce AgroSpectrum Technovate 2025, an exclusive two-day summit designed to bring together the brightest minds and innovators in the agritech sector. Set to occur on March 12-13, 2025, at the CIDCO Exhibition & Convention Center, Navi Mumbai, the event will offer an unparalleled opportunity to explore transformative solutions revolutionising agriculture.

The summit participants will have the opportunity to gain valuable insights from keynote speeches delivered by leading agritech experts. The event will feature in-depth panel discussions on key topics such as Smart Farming, Biotechnology, IoT, and more. In addition to expert insights, the summit will provide ample networking opportunities with acclaimed professionals, investors, and innovators.

AgroSpectrum India 2025 Awards will honour trailblazers in the agricultural ecosystem, recognising their exceptional contributions to advancing agritech, sustainable practices and community impact. These awards will bring to focus key individuals, organisations and startups driving the transformation of agriculture through innovation, technology and commitment to sustainable growth. Furthermore, the event will host the Ideate Competition, supporting emerging startups and breakthrough solutions that are shaping the future of agriculture.

Under the theme “Transforming Agriculture Through Innovation and Emerging Technologies,” AgroSpectrum Technovate 2025 will serve as a key platform for agritech entrepreneurs, farmers, agri-professionals, researchers, academics, policymakers, investors, and NGOs. The summit will create a dynamic environment where participants can engage with global thought leaders, discover cutting-edge technologies and forge valuable collaborations to drive the future of agriculture.

This transformative event of 2025 is dedicated to exploring cutting-edge advancements in agritech, fostering collaboration, sharing breakthrough ideas, and driving impactful innovation.

Highlights of the Event

Keynote Sessions: Gain insights from industry pioneers and thought leaders who are shaping the future of agriculture.

Panel Discussions: Engage with experts in agritech and emerging technologies to explore innovations and solutions that transform the agricultural sector.

AgroSpectrum Awards: Celebrate excellence in agritech and sustainability by recognising the achievements of organisations, startups, NGOs, and individuals making a transformative impact.

To cast your nomination for awards, visit https://agrospectrumindia.com/technovate2025/nominate.php

Ideation Forums: Participate in dynamic forums designed to tackle pressing challenges and develop future-focused strategies for the agri-tech sector.

Networking Opportunities: Connect with key stakeholders, including innovators, policymakers, industry leaders, and academia, to forge impactful collaborations.

For more details and registration, visit https://agrospectrumindia.com/technovate2025

Key Themes of the event

AgriTech Solutions and Digital Transformation: Explore the latest advancements in digital tools, platforms, and solutions revolutionising agriculture, from smart farming to data-driven decision-making.

Biotech Innovations in Farming: Learn how biotechnology is transforming crop yields, pest management, and sustainable farming practices through advancements in genetics and R&D.

Emerging Technologies: AI, IoT, and Robotics : Delve into ground-breaking technologies such as artificial intelligence, the Internet of Things, and robotics that are reshaping agriculture for efficiency and precision.

Sustainability and Precision Farming: Discover best practices in sustainability and precision farming techniques to ensure long-term productivity and environmental stewardship.

Enabling Self-sufficiency in Edible Oils

India is presently a net importer of edible oil, with 57 per cent of the total edible oil being imported from various countries. The insufficiency in edible oil is negatively impacting our foreign exchange (FOREX) by $20.56 billion, making it more important for India to become self-sufficient (Atmanirbhar) in the production of edible oil through the promotion of oilseeds and palm oil. The centre launched the National Mission for Edible Oils - Oil Palm (NMEO-OP) with an outlay of Rs 11,040 crore in August 2021. The centre contributes Rs 8,844 crore, while the states contribute Rs 2,196 crore. The mission is committed to escalating oil palm cultivation and elevating Crude Palm Oil production to 11.20 lakh tonnes by 2025-26.

Shivraj Singh Chouhan, Union Minister for Agriculture and Farmers' Welfare, who has been reviewing the progress of the ministry's programmes and schemes on January 6, has urged all states to intensify their efforts under the NMEO-OP. This mission serves as a cornerstone of India's vision to achieve self-sufficiency in edible oil production, reduce dependence on imports and enhance farmer incomes. The scheme is presently operational in 15 states nationwide, covering a potential area of 21.75 lakh hectares. So far, 111 nurseries with a capacity of 1 crore planting material have been established, along with 12 seed gardens with the potential of 1.2 crore planting material for area expansion under the mission.

As part of the promotion and bringing in more area under palm cultivation, the centre conducted Mega Oil Palm Plantation Drive last year from July 15 to September 15 with the help of state governments and oil palm processing companies such as Patanjali Food Pvt Ltd, Godrej Agrovet and 3F Oil Palm Ltd. During the drive, around 25 lakh planting materials were distributed among 15,755 farmers to cover over 17,000 hectares under oil palm cultivation in areas having suitable agroclimatic conditions.

Highlighting the significance of Mission Palm Oil Prime Minister Narendra Modi inaugurated the first oil mill under this mission in North-Eastern Region (NER) during his visit to Arunachal Pradesh in March last year. The NMEO-OP has provisioned Rs 5,870 crore exclusively for the NER region out of the total national budget of Rs 11,040 crore for the promotion of oil palm, where 90 per cent contribution will be made by the centre. Besides this, the mission is also promoting private players to invest in the NER for establishing post-harvest processing facilities in the region, where special assistance of Rs 5 crore is allocated for oil palm processing mills in the NER. As of March 2024, 10 new oil mills are proposed to be developed in the NER region.

The mission has been designed to promote oil palm in new geographies like NER, providing end-to-end support to farmers in terms of assistance in planting material, assured buyback from private players involved, and protecting the farmers from the global price volatility in oil palm by providing viability gap payment (VGP) to hedge farmers' risk. The government has timely revised the viability price of oil palm from Rs 10,516 in October 2022 to Rs 13,652 in November 2023.

Besides the VGP benefit, NMEO-OP offers special assistance of Rs 70,000 per hectare to farmers for planting material and management. The mission is also providing Rs 2,90,000 for the purchase of harvesting tools to farmers for palm oil cultivation and assistance of Rs 25 lakh for establishing custom hiring centres (CHC). This initiative reflects the government's commitment to promoting economic growth, empowering farmers, and fostering a sustainable and self-reliant ecosystem for palm oil production in India.

Agriculture and allied activities may get an allocation of Rs 1.70 lakh crore (an average rise of 12 per cent) in the Union Budget for 2025-26 (presented on February 1), as against Rs 1.52 lakh crore allocated in the upcoming Budget 2024 -25. The finance minister might allocate more funds for agriculture and allied activities as the ministry has already utilised over 92 per cent of funds allocated to the ministry during this year. This increase will further energise the agriculture schemes including NMEO-OP to be implemented properly for the benefit of farmers and the country.

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Join us at AgroSpectrum Technovate 2025! This premier event is your opportunity to be at the forefront of the agricultural revolution. Connect with global leaders, innovators, policymakers, and experts as we explore the latest breakthroughs in AgriTech and Biotechnology. This two-day event is designed to foster collaboration, spark new ideas, and drive transformative change in the sector.

Conference Tracks

- **Future-Ready Farming: Precision, Automation, and Sustainability in Action**
- **Agri-Fintech, Supply Chain, and Market Innovations**
- **The Future of Farming: AI, Robotics, and IoT Innovations**
- **Biotechnology and Emerging Innovations in Agriculture**

Why Participate?

Networking: Connect with policymakers, industry leaders, innovators, and researchers.
Showcase Innovation: Present ground breaking solutions to a vast audience.
Strategic Partnerships: Collaborate with stakeholders across the agriculture and technology sectors.

Highlights of The Event

◆ **Keynote Sessions:** Insights from global thought leaders shaping the future of agriculture.

◆ **Panel Discussions:** Engage with experts in agritech and emerging technologies to explore innovations and solutions that transform the agricultural sector.

◆ **Ideation Forums:** Collaborative spaces to brainstorm future solutions.

◆ **Networking Opportunities:** Build meaningful connections with industry leaders and innovators.

◆ **AgroSpectrum Awards:** Recognizing excellence in agri-tech innovation, sustainability, and impact.

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